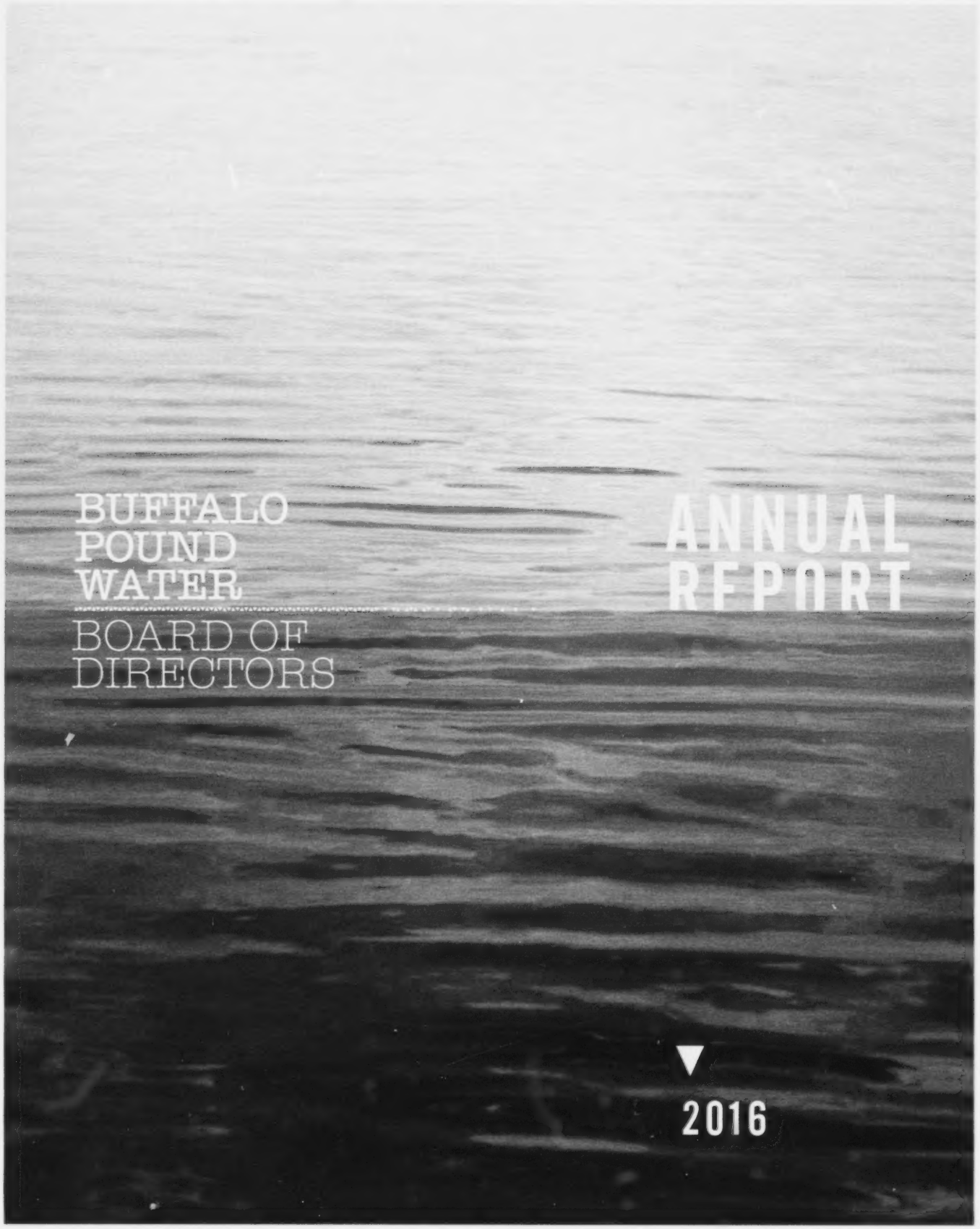
BUFFALO
POUND
WATER
BOARD OF
DIRECTORS
ANNUAL
REPORT
2016

BUFFALO POUND WATER

BOARD OF DIRECTORS

The Buffalo Pound Water Treatment Plant is located approximately thirty kilometres northeast of the City of Moose Jaw, Saskatchewan, on Highway No. 301, seventeen kilometres north of the intersection with Highway No. 1.

The Plant's mailing address is PO Box 944, Moose Jaw, Saskatchewan, S6H 2V2.

The telephone number is 306-694-1377.

Information about the Buffalo Pound Water Treatment Plant is also available from the Plant's website. This may be accessed by going to:

http://www.buffalopoundwtp.ca

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2016 ANNUAL REPORT

TABLE OF CONTENTS

INTRODUCTION		5
BOARD CHAIRPERSON'S LETTER		6
GENERAL MANAGER'S LETTER		7
MISSION AND GOALS		8
STRATEGIC PLAN		9
THE YEAR IN REVIEW		
RESOURCES		10
PLANT OPERATIONS AND MAINTENANCE		15
RESEARCH AND ANALYTICAL PROGRAMS		31
OPERATIONS BUDGET		34
CAPITAL BUDGET		34
APPENDICES		
APPENDIX 1	WATER QUALITY ANALYTICAL DATA - 2016	37
APPENDIX 2	AUDITED FINANCIAL STATEMENTS - 2016	48

INTRODUCTION

ABOUT THIS REPORT

This report summarizes the activities and major events of the Buffalo Pound Water Treatment Corporation (the "Corporation") for the operations of the Buffalo Pound Water Treatment Plant (the "Plant") during 2016. The report outlines the Mission and Goals, achievements and areas of concern. It is intended as an information source for City administration personnel, elected officials and the general public. This report also contains the Drinking Water Quality and Compliance Report required by provincial regulations and the Audited Financial Statements.

BUFFALO POUND WATER BOARD OF DIRECTORS

The Buffalo Pound Water Board of Directors (the "Board") was created in 2016 by the Unanimous Membership Agreement (UMA), which replaced the previous Buffalo Pound Water Administration Board from 1951. The UMA is an Agreement between the Cities of Regina and Moose Jaw (the "Owners") and the Corporation. In accordance with the Agreement, the skill based Board is comprised of six (6) independent members.

DERRICK BELLOWS, BOARD CHAIR

JOSHUA MICKLEBOROUGH

CHUCK MCDONALD

JUDY MAY

DAVE RICHARDS

DALE SCHOFFER

BOARD CHAIRPERSON'S LETTER

DERRICK BELLOWS
P.Eng., FEC, ICD.D

On behalf of the Board I am pleased to present the 2016 Annual Report of the Buffalo Pound Water Treatment Corporation. This is the first annual report of the newly incorporated entity.

Buffalo Pound Water provides abundant quantities of water to our customers that meet and exceed regulatory requirements and our own standards. That our outcomes are achieved effectively and efficiently, and with a high level of system reliability, is a testament to the dedication, expertise and creativity of our staff.

2016 was a year of governance change. The Owners, Cities of Regina and Moose Jaw, finalized incorporation with the creation of the Buffalo Pound Water Treatment Corporation on January 1 under The Non-Profit Corporations Act, 1995 (Saskatchewan). Ownership of the new corporation, known as Buffalo Pound Water, is distributed between the City of Regina with 74 shares and the City of Moose Jaw with 26 shares. In the spring, independent director positions were publicly advertised and a new board of six directors was appointed July 1. The Board advanced the transition into corporate governance strongly in the last half of the year; establishing new policy, adopting board management software, advancing risk management and long term capital replacement, guiding budget and financial projection development, and producing the first mid-year report for the Owners.

Through all the governance change, the ongoing business of the Plant continued. Operationally 2016 was much less stressful than recent years. Raw water quality in Buffalo Pound Lake improved somewhat and there were no significant treatment challenges or production loss due to Plant failure. The operating budget was challenged because a relatively wet summer resulted in reduced water sales and revenue.

Capital improvements continued in 2016. The major project to install ultraviolet disinfection and start renewal of electrical infrastructure continued on schedule and budget. Important other projects were completed. And, a long term capital renewal program was developed to address risks associated with an aging Plant.

Mr. Ryan Johnson provided excellent leadership and direction to the Plant as General Manager. His enthusiasm and commitment supported and empowered Plant staff to sustain a high level of Plant performance through the challenges of the year. As well, his support to the new board was instrumental in allowing the new governance structure to become effective quickly. The Board greatly appreciates his support and leadership.

I thank my fellow board members, Mr. Chuck McDonald, Mr. Josh Mickleborough, Ms. Judith May, Mr. Dale Schoffer, and Mr. David Richards for their wisdom in decision making through the past year.

The Board is grateful for the continued dedication of Plant management and staff in efficiently operating and maintaining the treated water supply for Moose Jaw and Regina.

This is my last Chairperson letter as I leave the Board in 2017. I am grateful for being part of this organization and proud of all that has been accomplished in recent years. I am confident that Plant staff and leadership, as well as the Board of Directors, will continue to achieve the mandate and objectives of Buffalo Pound Water.

GENERAL MANAGER'S
LETTER

RYAN JOHNSON
CD, M.A.SC., P.ENG.

The Plant met all and bettered many of the regulatory requirements and criteria for the production of safe drinking water in 2016.

There were no significant production challenges or critical infrastructure failures during the year, but the source water and equipment risks encountered in 2015 remain. We are committed to reducing those risks through effective planning, targeted research, and by continuing to improve and execute our asset management strategy.

The raw water quality of Buffalo Pound Lake improved slightly and resulted in a slight reduction of chemical costs.

The Plant was reorganized during the year, which created three distinct divisions for each business function of the Corporation. Those divisions are: Water Lab & Research, Operations & Safety, and Maintenance & Engineering.

The Corporation's first Safety Management System Framework was developed and the Safety Manual was completed. The Corporation joined the Safety Association of Saskatchewan Manufacturers for third party auditing and to act as an advisor.

Water quality research continued during the year. Main topics of research included: what impacts chlorination and pH have on the water treatment process, production of disinfection by-products, and the corrosiveness of treated water. This is important research that will be used in future process improvements.

Major Capital Projects continued with the construction of the ultraviolet treatment system, which has progressed in spite of significant and unusual contractual challenges. The Main Plant electrical substation and generator design work is progressing exceptionally well and will be tender-ready in early 2017.

In an effort to continuously improve how we manage our assets, the Capital Planning process was completely reworked in 2016. This new process places a greater emphasis on pre-planning work to clearly identify the scope, obtain cost estimates, prioritize, and formalize process. This results in the streamlining of project work. By year-end, all projects were either completed or underway.

There have been some issues related to the water sales forecasts the Corporation has received from the Cities, in that the forecasted water sales have far exceeded actual water sales. Consequently, the Board has adopted a probabilistic forecasting method to reduce the inflated water sales forecasts.

I would like to thank the Buffalo Pound Water Management Team and Staff for their hard work and dedication to ensure that the Corporation met its mandate, goals and objectives during the course of the year. I would also like to express my gratitude to the Board of Directors for their insight and the input they provide to ensure that the Corporation is able to meet its mandate and mission of supplying safe, dependable and affordable water to our customers.

MANDATE, MISSION AND GOALS

MANDATE

The Corporation will reliably and efficiently provide safe, high quality and affordable drinking water to the Cities.

MISSION

To provide for the Cities of Regina and Moose Jaw, a reliable and affordable supply of safe, high-quality drinking water which meet the needs and expectations of consumers.

GOALS

- Treated water that meets the quality expectations of the citizens of Moose Jaw and Regina, as well as meeting, or exceeding, all government regulated parameters.
- Operational practices and controls that ensure a continuous and safely-treated supply of water within an environmentally-responsible and cost-efficient operation.
- Judicious monitoring of the treated water from the Plant to the end of the Cities' distribution systems. Appropriate monitoring of the water in Buffalo Pound Lake, the Upper Qu'Appelle River and Lake Diefenbaker to identify long-term trends and areas of concern to protect the water supply.
- Water quality research to identify possible chemical and microbiological contaminants and to test and implement the best available treatment technologies, thus ensuring that the Water Treatment Plant can meet current and future expectations for regulated parameters.

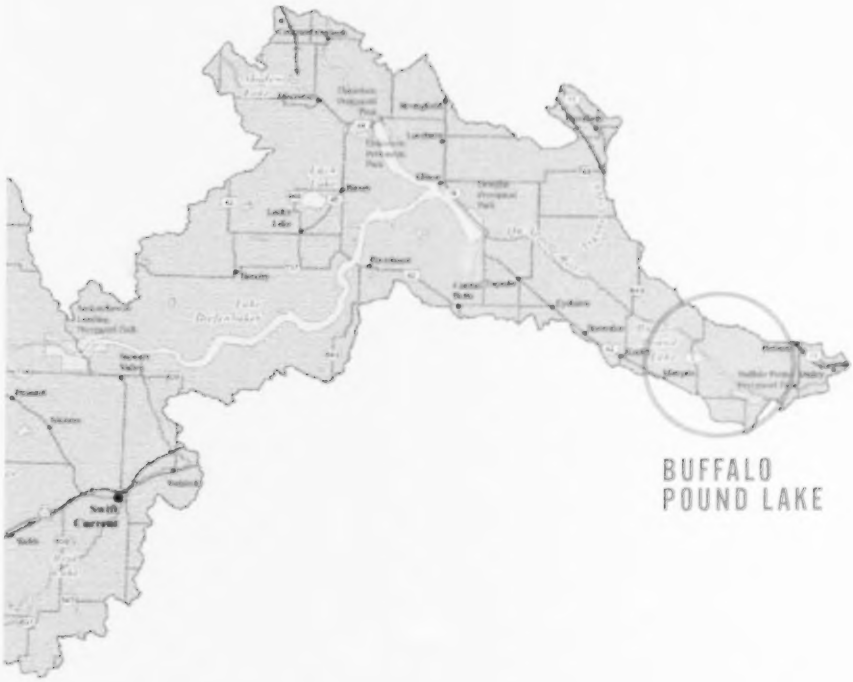
MANDATE, MISSION AND GOALS CONTINUED

MISSION	To provide for the Cities of Regina and Moose Jaw, a reliable and affordable supply of safe, high-quality drinking water which meet the needs and expectations of consumers.				
STRATEGIC DIRECTION (Vision)	By 2018, the Plant delivers on its mission during the transition; operations is more proactive and planned, there is capital investment and water rates are adjusted accordingly so we have the funds we need based on projections – complete total cost.				
OPERATIONS	Water Quality (To meet regulatory requirements)	Water Quantity (To provide an uninterrupted supply of water)	Maintenance Management (To maintain current equipment and assets)	Planning and Capital Projects (To be sustainable)	
PEOPLE AND SYSTEMS	Safety Culture (To reduce injuries)	Preventative Maintenance Program: CMMS (To better plan maintenance activities)	Risk Management (To identify and mitigate risks)	Board Member Support (To support new governance Board)	Talent Management (To align staff to meet the Plant's needs)
FINANCIAL	Customer Service Agreement Management: Water Contract (To set clear expectations)	Capital Procurement Policies & Procedures (To be transparent on procurement)	Administration Management: Contract Services (To identify financial services to the Plant)	Operating & Capital Reserve Management (To ensure proper reserve management practices)	Budget Compliance (To manage the budget in an unpredictable sales environment)

STRATEGIC PLAN 2015 – 2018

The Corporation's Strategic Plan for 2015 – 2018 is above. There have not been any revisions to the Plan since it was approved in 2015. All of the targets in the Strategic Plan were met at year end with the exception of:

- Risk Audit (deferred to 2017)
- Customer Service Agreement with Owners has not been approved
- Procurement Policies (in development stage but not yet completed)



THE YEAR IN REVIEW

RESOURCES

WATER SOURCE

Water for Regina and Moose Jaw is taken from Buffalo Pound Lake, a shallow reservoir in the Qu'Appelle Valley which is a part of the Upper Qu'Appelle River. The lake is 29 km long, 1 km wide but has an average depth of only 3 metres. The surface area of Buffalo Pound Lake is 2900 hectares inferring it has a capacity of 90 million cubic metres at the "full supply level" of 509.3 metres above sea level. Water levels in Buffalo Pound Lake are controlled by the Saskatchewan Water Security Agency and maintained by the release of water from the Qu'Appelle Dam on Lake Diefenbaker. The mean annual water release from Lake Diefenbaker ranged from 1.2 to 2.7 m^3/sec in recent years. Rain, snow melt and flood waters from the Moose Jaw River have compromised water quality.

The lake water is potentially affected by discharges from point sources (upstream cities) and non-point sources (agricultural and recreational).

Buffalo Pound Lake is generally free of industrial pollution but is naturally rich in nutrients (phosphate, nitrogen and dissolved organic carbon) which encourage the growth of phytoplankton (typically diatoms in the winter and green algae or cyanobacteria in the summer). Weed growth can also be extensive. Algae and weeds pose many treatment challenges such as high chemical demands and undesirable tastes or odours. The lake and watershed appear to also be impacted by ground waters and surface runoff infusing minerals.

UPPER QU'APPELLE RIVER WATERSHED

PLANT TREATMENT

Raw water from Buffalo Pound Lake passes through a series of treatment stages designed to remove impurities such as algae, bacteria, clay particles and dissolved organic materials. The objective of this treatment is to produce water that is clear, colorless, odour-free, aesthetically pleasing and safe to drink.

The treatment process consists of six stages: chlorination, cascade de-gasification, coagulation/flocculation, clarification, filtration and carbon adsorption.

Lake water enters a pumping station located on the south shore of Buffalo Pound Lake through two submerged intakes. Raw water is chlorinated and then pumped to the Plant via two pipelines connecting the pumping station to the main treatment Plant. The pipelines are 1.05 and 1.35 metres in diameter, extend a distance of approximately 3,000 metres and rise 82 metres. After reaching the Plant, water is initially divided into two streams, each of which has cascade de-gasification, coagulation/flocculation and clarification. The streams are then recombined for the final stages of treatment, including filtration, carbon adsorption and further chlorination.

Cascade operation is used to remove excessive dissolved gas levels in the raw lake water. Excessive dissolved gases are most commonly produced by photosynthetic bacteria and algae. During cascade de-gasification, the water falls over a series of steps which releases excess dissolved gasses and prevents the formation of gas bubbles in later treatment processes. Clarification and filtration processes could be impeded by gas bubbles that attach to particles of floc, causing them to float, rather than sink, and by causing air binding in the filters.

If conditions warrant, Powdered Activated Carbon (PAC) is added to reduce taste and odour. The use of PAC, while relatively infrequent, is occasionally necessary when granular activated carbon contactors are off line or to temporarily reduce the odour loading when the contactors are on-line.

Coagulation and flocculation are the next steps in treatment. Aluminium sulphate (alum), for the summer season, and polyaluminium chloride (PACl), for the winter season, is vigorously mixed with the water. In the process of coagulation, the alum and PACl neutralize surface charges on particulate matter contained in the water and forms a fluffy precipitate (floc) that entraps suspended materials such as algae and clay particles. The water is then stirred slowly in flocculation tanks to allow floc particles to become larger and denser prior to their removal.

The floc-bearing water then flows through clarifiers, where most (more than 95%) of the floc with its entrapped impurities is allowed to settle by gravity to the bottom while clear water is constantly removed from the top. Settled floc is removed from the clarifiers as sludge and is pumped to holding lagoons where it is further separated into clear water (returned to the lake) and solid sludge (removed for disposal).

Any floc that was not removed by clarification is separated in the filtration stage. Water is passed through mixed-media filters consisting of a top layer of coarse anthracite followed by successive layers of fine silica sand, and even finer garnet sand. Any remaining particulate matter or floc is trapped by the filters. Filters are cleaned by backwashing with clean water. The filtration step completes the removal of particulate impurities.

The removal of dissolved organic impurities, which are responsible for taste and odour, is accomplished next in the carbon adsorption stage of treatment. Large rectangular tanks (contactors) contain Granular Activated Carbon (GAC) to a depth of 3 metres. Water is lifted by Archimedes screw pumps from the bottom of the filters and taken to the top of the contactors where it is allowed to flow by gravity down through the GAC. GAC contains many microscopic pores which adsorb dissolved chemical impurities. Water is in contact with the GAC for 30 to 80 minutes, depending on flow rates, and emerges freed of the dissolved organic materials which cause objectionable taste and odour.

The GAC filtration process at the Plant was designed for taste and odour removal and is used during periods of poor taste and odour in the raw water; the normal period of operation is from May until December.

All stages of water treatment are now essentially complete. Prior to delivery by pipeline to the consumers, chlorine levels are adjusted, if necessary, to provide adequate disinfection and to counteract any possible contamination encountered during its travel to the cities' reservoir and distribution systems. Water delivered to the City of Moose Jaw is also fluoridated during pumping.

The carbon used in the contactors retains its effectiveness for taste and odour reduction up to seven (7) months, after which time it must be regenerated or replaced. It was found to be cost effective as well as environmentally responsible to regenerate the spent GAC rather than to discard it and purchase new. Regeneration is accomplished by heating the spent GAC to 850°C in an oxygen-free atmosphere contained in a fluidized bed gas-fired furnace.

Spent GAC is transferred by pipeline as a slurry from the contactors to the furnace, regenerated to process specifications, and returned to the contactors for reuse. Carbon regeneration is usually performed at the Plant generally from mid-November to mid-April.

ENVIRONMENTAL PROTECTION AND CONSERVATION

The Plant, like any large industrial facility, has the potential to affect the environment. The Plant has facilities in place to handle all process wastes including alum sludge, off gases from the carbon regeneration facility, laboratory wastes, various solid wastes generated by Plant operations, and sewage. The Plant uses a considerable quantity of electrical energy in its operation; conservation efforts give returns in the form of reduced demands on the environment and lower operating costs. Future upgrades to the Lake Pump Station, to convert the pumps to variable frequency drives should also reduce power consumption at the lake and are included in the Capital Budget.

A series of sludge lagoons are used in the treatment of the alum sludge waste stream. This form of sludge management can be very effective in ensuring that the sludge is not released to the environment. Sludge is exposed to a natural freeze-thaw cycle that dewaters it to produce a nearly dry granular material which is transported to a landfill site. Buffalo Pound is one of the few water treatment Plants in Canada with the ability to manage waste sludge in this manner.

The natural gas-fired furnace in the carbon regeneration facility produces off gases which are thoroughly scrubbed before released to the atmosphere.

RESOURCES (CONTINUED)

Waste disposal agencies are contracted to handle laboratory wastes and solid wastes generated by the Plant. As it becomes necessary, firms specializing in hazardous waste disposal are contracted to dispose of chemical wastes.

The Plant recycles fiber based materials and metals.

Sewage generated by the Plant is pumped to treatment and evaporation lagoons located on Plant property. The primary lagoon has a geotextile fabric and bentonitic clay liner to prevent seepage.

WATER QUALITY MONITORING

A well-equipped accredited laboratory is located on site and used to monitor the quality of raw and treated water as well as water quality at several intermediate steps in the treatment process. Major process control parameters (turbidity, pH, chlorine residual, particle counts, dissolved oxygen and temperature) are monitored continuously by instrumentation communicating with the Plant process computer system.

Analyses are performed for most regulated parameters on a daily to monthly schedule; for other parameters (most trace-level organics and metals) samples are sent to commercial laboratories. Analytical results are compared to Canadian Federal guidelines and to Saskatchewan Ministry of Environment (MOE) objectives. All criteria for safe drinking water were satisfied by the Plant in 2016.

Analyses for a wide variety of physical, chemical, and microbiological parameters are performed in the Buffalo Pound Laboratory. Some 65 different constituents are routinely determined. The 2016 results are summarized in Appendix 1.

The quality of the regenerated granular activated carbon is monitored by Plant staff for a variety of physical and chemical parameters.

A vigorous in-house quality control program is maintained to ensure data generated by the Plant Laboratory is valid. The laboratory is accredited by the Canadian Association for Laboratory Accreditation (CALA) for 30 chemical and bacteriological parameters.

PLANT OPERATIONS AND MAINTENANCE

WATER PRODUCTION

Water Production and sales (in megaliters) were as shown in Table 1. (See also related Graphs 1 and 2.) Total sales to the cities in 2016 were 27,148.8 ML to Regina and 5,398.4 ML to Moose Jaw. Sales to Regina decreased 3.2% from 2015 and sales to Moose Jaw decreased 4.4%.

Sales to the SaskWater Corporation in 2016 increased by 21.8%, to 313.4 ML. Sales to SaskWater represent less than one percent of the Plant's production.

Graph 3 shows annual water production by year since the Plant began operation in 1955.

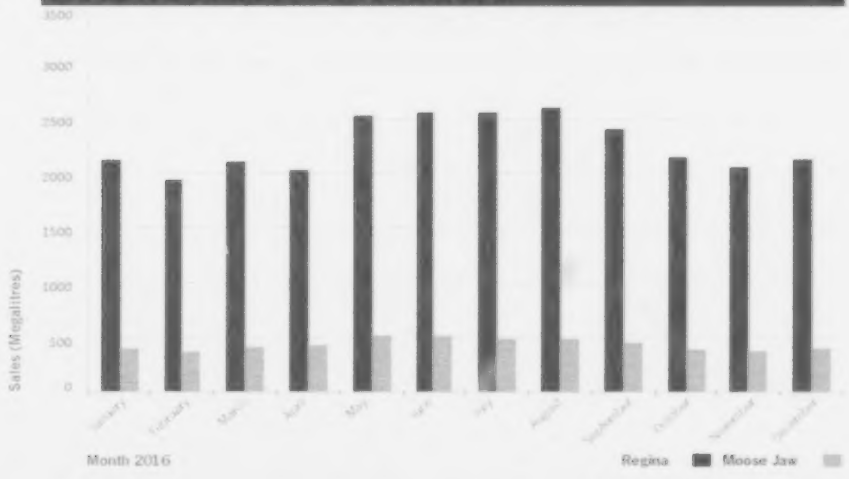
2016 WATER SALES IN MEGALITRES (ML)
TABLE 1

Month	Regina	Moose Jaw	SaskWater Corp.	Totals
January	2120.8	415.0	18.5	2554.3
February	1948.0	375.0	17.7	2340.7
March	2100.4	427.3	18.9	2546.6
April	2023.5	434.3	21.9	2479.7
May	2523.5	533.6	26.3	3083.4
June	2551.9	531.9	30.3	3114.1
July	2555.0	505.6	34.3	3094.9
August	2601.9	493.3	36.0	3131.2
September	2404.9	465.6	32.7	2903.2
October	2144.8	408.7	29.2	2582.7
November	2064.1	391.5	24.1	2479.7
December	2110.0	416.6	23.5	2550.1
Totals	**27,148.8**	**5,398.4**	**313.4**	**32,860.6**

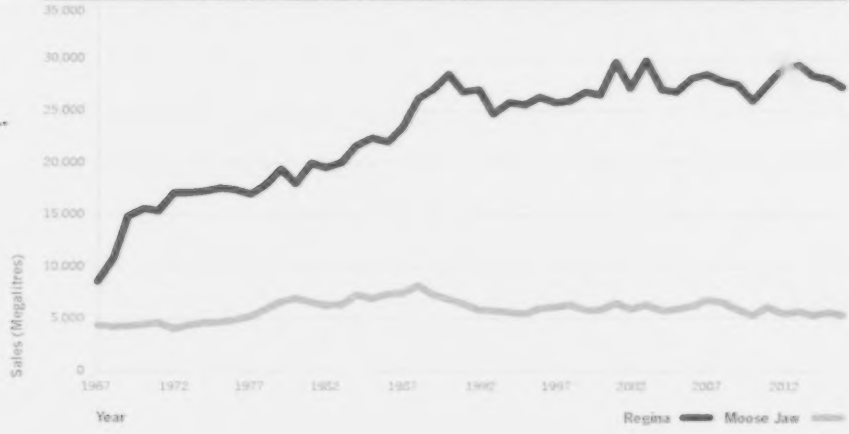
THE YEAR IN REVIEW CONTINUED

PLANT OPERATIONS AND MAINTENANCE (CONTINUED)

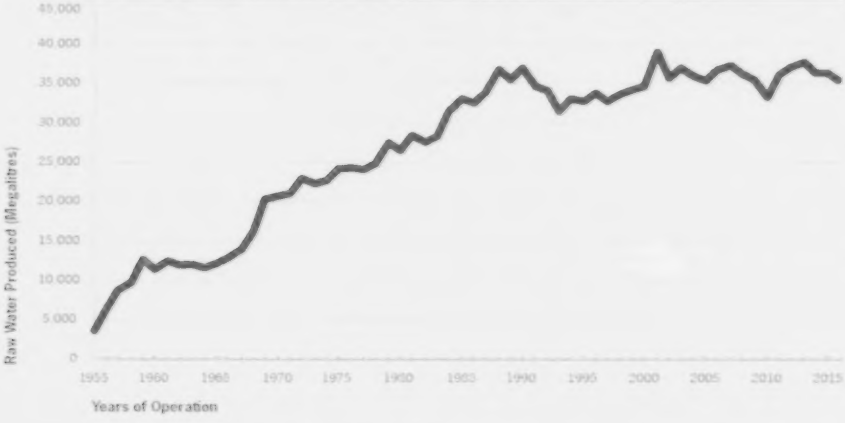
GRAPH 1 **MONTHLY SALES TO REGINA AND MOOSE JAW**



GRAPH 2 **ANNUAL SALES TO REGINA AND MOOSE JAW**



GRAPH 3 **ANNUAL RAW WATER WITHDRAWN**



PLANT OPERATIONS

The processes employed at the Plant are modified during the year as required by changing water quality in Buffalo Pound Lake. Ice came off of Buffalo Pound Lake on April 5th. The lake froze over December 1st which is relatively late based on historical record.

Lake water quality improved marginally in terms of dissolved organic carbon (DOC) and mineral content. However, both parameters remain relatively high in terms of historical values. Average DOC concentrations declined to 8.5 mg/l from 10.2 mg/l in 2015. Furthermore, the DOC has gradually changed in character to a less humic form. This has resulted in reduced production of trihalomethanes in the treated water.

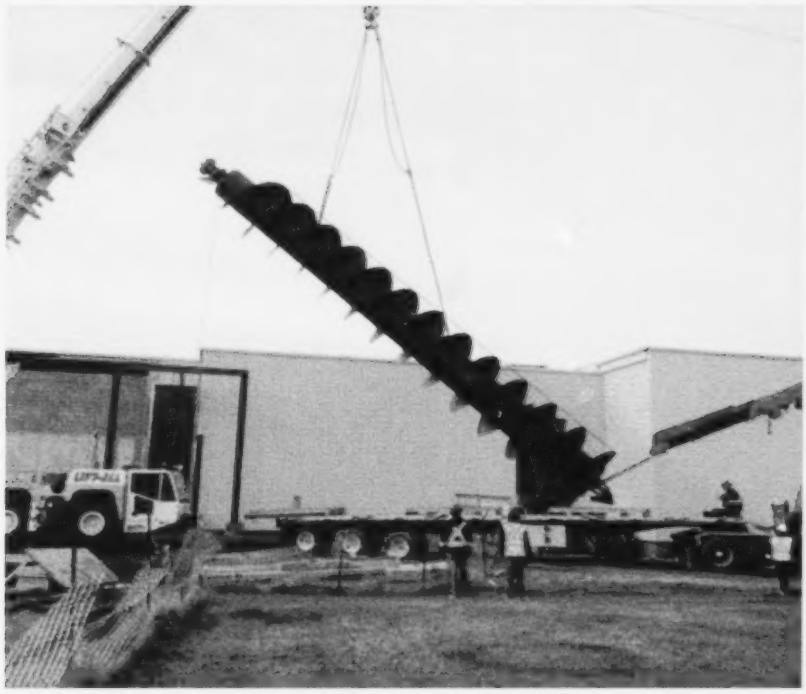
Trihalomethanes (THMs) at the Plant averaged 61 ug/l (weekly analyses); as compared to the 78 ug/l annual average produced in 2015. Most of this THM reduction is due to the reduced formation of chloroform ($CHCl_3$). Chloroform is most impacted by the character and concentration of the DOC. The other THM species that contain bromine were at best only slightly reduced. This reflects the high mineral content of Buffalo Pound Lake. Bromide occurs naturally in lake water as a result of local run off and ground water intrusion. Bromide is oxidized by aqueous chlorine to hypobromous acid and can then react to form the brominated forms of THMs [Bromodichloromethane ($CHBrCl_2$), Dibromochloromethane ($CHBr_2Cl$) and Bromoform ($CH Br_3$)].

THM concentrations at the Plant are lower than those found in the Owners' distribution systems. This is due to continued reaction or DOC remaining after treatment with free chlorine and hypobromous acid as well as the hydrolysis of other chlorinated disinfection by-products. Laboratory experiments conducted in 2015 indicated that removing prechlorination and only applying chlorine after the coagulation and clarification processes could greatly reduce THM concentrations in the treated water and, to a somewhat lesser extent, reduce THMs in the Cities' distributed water as well.

A full scale Plant trial of operating without prechlorination was conducted as construction activities allowed from April 11th through April 22nd. In addition to the coagulation, clarification, and filtration processes the Plant must achieve a 0.5 log (68%) inactivation of Giardia spp. by the disinfection process alone. Using both the GAC clearwell followed by the filter clearwell ensured that the Plant achieved a greater than one log (90%) inactivation of Giardia spp. by disinfection alone. This, coupled with the credit for the existing coagulation, flocculation, and filtration processes ensured a removal/inactivation for Giardia spp. of 4 logs (99.99%).

During the test period, THM levels at the Plant declined by over 50% mostly due to the reduced concentrations of both $CHCl_3$ and $CHBrCl_2$. Significant reductions of $CHBr_2Cl$ were noted as well. Within the Owners' distribution systems, THMs were reduced by at least 30% resulting in THM concentrations of less than 90 ug/l. (The THM guideline value is an annual average of 100 ug/l.) Almost all of the reduction was a result of lower $CHCl_3$ formation. A slight removal of $CHBrCl_2$ was noted while $CHBr_2Cl$ and $CHBr_3$ concentrations were largely unchanged.

UV DISINFECTION FACILITY UNDERWAY



THE YEAR IN REVIEW CONTINUED

PLANT OPERATIONS AND MAINTENANCE (CONTINUED)

The granular activated carbon contactors (GAC) were put into operation May 31st which is somewhat later than normal. They remained in service until November 25th when they were taken offline somewhat earlier than normal to facilitate construction in the GAC building.

Cold water temperatures bring about different problems for water treatment. The kinetics of alum coagulation is much slower in cold water and so the Plant used a Polyaluminum Chloride (PACl) coagulant from January 1st until March 31st and again after December 12th. PACl forms a better floc somewhat faster than alum which benefits the Plant in terms of reduced chemical addition and residuals production. Another benefit from PACl use is that the finished water is of slightly higher pH and so is somewhat less corrosive. The Plant does not have provision for the addition of alkaline chemicals that could raise the pH of the treated water to more appropriate levels.

As a result of promising laboratory trials, a cationic polymer was routinely added in the flocculators at 0.1 mg/l to function as a flocculent aid and strengthener. This treatment was as one of the corrective actions instituted to deal with zones of high shear within our existing treatment equipment as well as clarifier short-circuiting that occurs during swings in raw water temperature. These disruptions breakup floc and we endeavour to deal with these by chemical modifications to the floc. Channel water levels were also kept higher throughout the year to reduce the shear experienced by floc within our clarifiers.

There were no production events that occurred where the Owners' demands were not met. Due to the wet summer, overall water production levels were down. The peak day of demand was 142.9 ML on September 9th.

CARBON REGENERATION FACILITY

The carbon is regenerated during the winter so that it can be used to remove taste and odour from the water the following summer. The 2015/2016 regeneration season was from November 12, 2015 to April 19, 2016. The 2016/2017 regeneration season commenced November 16, 2016.

WASTEWATER FACILITY

The clarifier underflow removes particulate matter (alum sludge) from the raw water. The effluent stream is directed to sludge lagoons where the sludge is deposited and the clear water overflow returns to Buffalo Pound Lake. The sludge from the stockpile location was removed to the Moose Jaw landfill. The sludge from the lagoon was excavated to the stockpile location.

MAINTENANCE AND CAPITAL PROJECTS

Effective maintenance plays a key role in keeping the Plant running efficiently and producing high quality water. All vessels are drained, cleaned and inspected at least annually. All critical Plant equipment is inspected, tested and maintained at least annually to help ensure satisfactory operation during peak flow demands. All water quality monitoring instruments are checked or calibrated in accordance with the Board's Quality Assurance/Quality Control Policy. The results from major on-line instruments are compared to laboratory instruments.

MAJOR CAPITAL PROJECT

The Owners committed funds in 2010 to upgrade the Plant. The initial scope of work was to: add ultraviolet disinfection to enhance the deactivation of protozoa cysts; improve the handling of treatment Plant residuals; add an additional screw pump; increase the clear well storage capacity; provide corrosion control and address overall water treatment upgrades for the Plant.

As the project progressed, a clearer picture emerged as to which works were the most critical. There has been an increasing frequency of significant electrical failures. An Electrical Master Plan was commissioned as additional work to the original scope. The Conceptual Design report examined alternatives to improve treatment processes. A Pilot Study was undertaken to provide proof of concept, design parameters and to update the costs estimated in the Conceptual Design Report.

Combining the work identified in the Conceptual Design, Electrical Master Plan and the Code and Condition Assessment resulted in estimated costs significantly exceeding available funding. The identified work was prioritized based on risk. The current scope of work includes: an ultraviolet disinfection facility; an additional Archimedes screw pump; replacement of the Main Plant's electrical substation and related electrical work which is funded by the Owners for approximately $34.5 million. The remaining scope was placed into the Capital Plan and removed from the Major Capital Project.

Three (3) major electrical failures occurred in 2015. To minimize the risk of service interruption in the face of aging and failing electrical infrastructure, the Major Capital Project and the Capital Plan were adjusted. The Main Plant Substation now includes electrical generation. Design for a new Lake Pump Station 72/138 KV Transmission line was also added to the Major Capital Project. The costs for the two additions will be borne directly by the Corporation when funds become available.

THE YEAR IN REVIEW CONTINUED

PLANT OPERATIONS AND MAINTENANCE (CONTINUED)

Construction of the UV Facility began in August of 2015, and was scheduled to be totally complete by the end of March 2017. There have been numerous and significant non-conformances to the design that are currently in dispute. The project schedule, and in particular the schedule of the identified tasks, has changed significantly from the initial submission. A Notice of Lien has also been submitted by a sub-contractor. It is reported that the project is to be totally complete in early April 2017.

The Main Plant Electrical Substation is at final design review and will be ready for construction in early 2017 pending the identification of a source of funding for the generators. The transmission line design is scheduled to be completed in May of 2017 and tendered for construction in 2018.

CAPITAL PLAN

The Capital Plan is developed to minimize risks as soon as possible based on available funding.

The Capital Plan has identified approximately 30 projects in excess of $140 million dollars if the projects are completed in a relatively short timeframe. If these projects are to be spread out over a longer period of time, escalation costs can force this value to an excess of $200 million. Considering the potential dollar values at stake, a Business Case is currently being developed to determine the optimal solution for the renewal of the water treatment plant. Completion is expected in April of 2017, at which time, the capital plan will be reviewed.

Numerous other smaller projects were undertaken as required; such as: Train A Channel Repair Design; Replacement of Pump C; Exterior Masonry Assessment; Filter Roof Replacement, Access Road Pavement Assessment; Security Upgrades; Steel Corrosion Assessment, and a Clarifier Assessment for the Mitigation of Thermal Gradients.

Historically, the Plant has constantly reviewed and updated the projects in the Capital Budget. A year to year examination of the projects would illustrate the changing urgency and importance of various projects. 2016 was no different as some projects were advanced as a result of newer experiences and information. Additionally, there are some efficiencies or synergies to be taken advantage of by grouping, ordering or otherwise organizing related projects, while still maintaining budgetary discipline. For example, the project for the Lake Pump Station Renewal Design, identified above, was released as a single package of work but consisted of several previously identified scopes of work.

Other implementations have been made to improve the process as new Capital Projects are identified, prioritized and funded to modernized capital planning.

PLANT EXPANSION

Currently there is no funding allocated or being allocated for Plant expansion. The estimated cost to expand the Plant by 75 million litres is $96.8 million.

PLANT SAFETY

In the spring of 2016 the Buffalo Pound Water Treatment Plant started an evaluation and revitalization of the current Safety Management System. All current information and processes were analyzed and an internal gap analysis was done on what was currently in place and what is required for the organization to successfully complete an internal safety audit by a recognized safety organization.

From the gap analysis an action plan was put into place to develop processes and documentation systems to ensure the Corporation will be meeting regulations and ultimately has a functioning system that keeps the staff working safely each and every day. The Safety Management System will also be geared towards constant review and continuous improvement.

The goal is to have the Safety Association of Saskatchewan Manufacturers, with whom the Corporation is a member of, conduct a gap analysis and an external audit to which the corporation would achieve a certificate of recognition and maintain that moving forward.

The Corporation tracks and records all incidents that occur at the facility and take a methodical approach to determining root causes and implementing corrective actions to prevent reoccurrence. In 2016 there were 2 Lost Time Incidents involving staff which were investigated. Corrective actions were implemented with follow ups being conducted to ensure they will not occur again.

INCORPORATION

The governance review project which commenced in 2012 was completed in 2015. The Owners, with the assistance of WATSON, developed a Unanimous Membership Agreement (UMA) which defines the relationship between the Owners and the authorities of the Board. The UMA replaces the 1951 and 1991 Joint Venture Agreements and changed the Buffalo Pound Water Administration Board to a true Governance Board called the Buffalo Pound Water Treatment Corporation Board of Directors. The new entity is formally known as the Buffalo Pound Water Treatment Corporation, but operationally referred to as Buffalo Pound Water.

Buffalo Pound Water was created as a non-profit subsidiary of the Owners under The Non-profit Corporations Act, 1995. The UMA was approved by both City Councils, filed along with the Articles of Incorporation and came into effect on January 1, 2016.

RISK REVIEW

The total number of risks that may impact the Board's ability to supply water to the Cities has increased from 37 risks identified in 2014 to 41 by the end of 2016. Some risks were added based on the ongoing review of the likelihood of occurrence and the associated impact of such occurrence. The only changes to the Risk Registry for 2016 were due to the three (3) electrical system failures. The likelihood has increased from moderate to high for four (4) electrical risks.

The following represents a summary of the the number of current risks, their status and source of funding for reduction or mitigation as of December 31st.

17	Mitigate	Capital
13	Accept	Operating
6	Accept/Mitigate	Operating & Capital
3	Accept/Mitigate	Governance
1	Transfer	Province
1	Mitigate	Operating

A significant number of the risks can be addressed in the future based on the governance changes along with the Board's ability to fund capital projects, effectively reducing these risks over the next 10 years.

THE YEAR IN REVIEW CONTINUED

PLANT OPERATIONS AND MAINTENANCE (CONTINUED)

NATIONAL WATER AND WASTEWATER BENCHMARKING INITIATIVE

The results of the 2014 National Water & Wastewater Benchmarking Initiative data and peer comparison of other Water Treatment Plants across Canada were presented to the Board and Owners in 2016. The Corporation compared relatively well with its peers in Canada. The water rate is generally lower than other Water Treatment Plants and compared well with its goals of Protecting the Public Health, Ensure Adequate Capacity, Environmental Stewardship and Providing a Safe and Productive Workplace.

There is a two year lag for reporting the data with the National Water and Wastewater Benchmarking Initiative.

The Plant did not fare as well with Providing Reliable Service and Infrastructure due to the historically low capital reinvestment in the Plant.

In other areas of the report which are statistically significant, the Plant has better staff availability than other facilities; has higher power usage; has higher Green House Gas emissions; has a low reinvestment rate; higher treated water with total and dissolved organic carbon than most facilities.

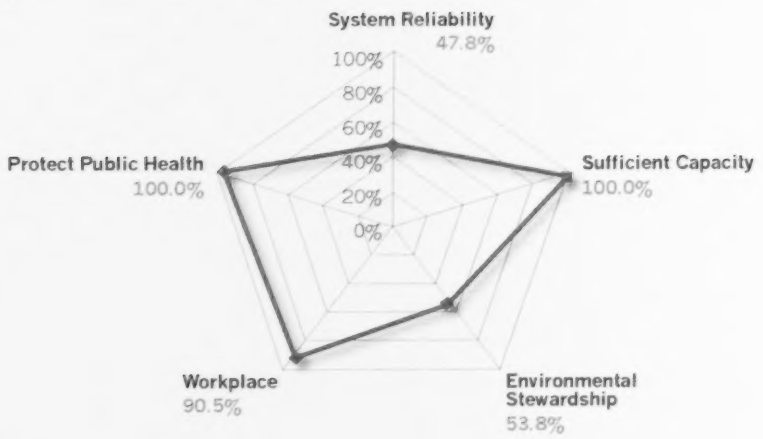
2014 STATISTICAL ANALYSIS SUMMARY

	Mean of Water Treatment Plants in Canada	Buffalo Pound Result	Comments	Statistical Significance
Capital Reinvestment (5 yr avg Capital Reinvestment / Replacement Value)	1.23%	0.04%	Reinvestment into the Plant is very low compared to other water treatment plants in Canada	
Unplanned Hours (# of unplanned hours that plant could not operate at rated capacity)	0.97	Statistical Significance		
Unplanned Maintenance Hours (Reactive Maintenance Hours / Total Maintenance Hours)	7.37%	11.74%		
Unit Filter Run Volume (m3/m2)	294.47	385.34		
90% Capacity (# days plant operated over 90% and over 100% of capacity)	0.00	0.00		
Total FTEs / 1000 ML Treated (hrs)	1.44	0.91		
TOTAL O&M COST / ML TREATED	$249.03	$248.90		
Annual O&M Cost as % of Replacement Value	4.02%	2.82%		
(O&M Cost + Capital Reinvestment Cost) / ML Treated	$369.53	$264.10		
Total Energy Consumed in kWh / ML Treated	630.33	1020.56	High energy use to pump raw water from the valley and treated water to the Cities as well as carbon regeneration	
Chemical Cost / ML Treated	$44.49	$55.36		
% of Water Wasted During Treatment Process	7.68%	6.46%		
% of Backwash Treated	81.82%	0.00%	Majority of the plants do not recycle backwash water. the Plant does not due to Cryptosporidium and Giardia in the lake	
GHG Emissions from Energy Consumed in the Operation of Plant (kg CO2 / ML Treated)	249.25	844.50	Energy used is based on coal fueled electrical power generation and natural gas. Saskatchewan is at a major disadvantage	
# O&M Accidents with Lost Time / 1000 O&M Labour Hours	0.01	0.02		
# Sick Days taken per O&M Employee	7.88	8.00		
# UNAVAILABLE O&M HOURS / TOTAL PAID O&M HOURS	21.59%	12.66%	Plant staff are efficiently and effectively utilized	
Total Overtime Hours / Total Paid O&M Hours	6.00%	6.66%		
Average Annual Treated Water Turbidity (NTU)	0.07	0.03		
# of Total Coliform Occurrences in Treated Water (CFU/100 mL)	0.24	0.00		
Treated Water Nitrates (mg/L)	0.67	0.40		
Raw Water Total Organic Carbon (mg/L)	5.87	8.40		
Treated Water Total Organic Carbon (mg/L)	2.09	3.90	Poor raw water quality from the Buffalo Pound Lake post 2011 has impacted the output after treatment	
Raw Water Dissolved Organic Carbon (mg/L)	6.26	7.70		
Treated Water Dissolved Organic Carbon (mg/L)	2.13	3.90	Poor raw water quality from the Buffalo Pound Lake post 2011 has impacted the output after treatment	

AECOM

NATIONAL WATER & WASTEWATER BENCHMARKING INITIATIVE

OVERALL RADAR CHART



THE YEAR IN REVIEW CONTINUED

PLANT OPERATIONS AND MAINTENANCE (CONTINUED)

GOALS

Provide Reliable Service and Infrastructure

- ☑ 5 year Average Capital Reinvestment / Replacement Value
- ☑ # of Unplanned Hours that Plant Could Not Operate at Rated Capacity
- ☑ Unplanned Maintenance Hours / Total Maintenance Hours

Protect the Environment

- ☑ % Residuals
- ☑ GHG Emissions from Energy Consumed/ ML Treated

Protect Public Health

- ☑ # of days over Group Target for Turbidity
- ☑ # of days with Total Coliforms
- ☑ # of days over Group Target for Nitrates

Ensure Adequate Capacity

- ☑ ADD / Existing Licence Capacity
- ☑ # of Days Plant Operated at >100% Capacity

Provide Safe and Productive Workplace

- ☑ # of sick days taken per field employee
- ☑ # of Field Accidents with Lost Time / 1,000 Field labour hours
- ☑ # of Lost Hours due to Field Accidents / 1,000 Field labour hours

2016 KEY PEFORMANCE INDICATORS

The Corporation's KPI use targets that are set by the Board, NWWBI results or are regulatory requirements. These are reviewed annually by the Board and the targets adjusted accordingly.

All regulatory requirements have been met in 2016.

The KPI are rated based on a comparison of the Plant's score versus the target to determine the threshold which is assigned to a colour coded system similar to what other organizations use for reporting purposes.

Only items which rated as either Ideal or Critical are listed below.

(i) Five year running average Capital reinvestments/replacement value.

The Plant is far below the industry for the amount that has been invested over the last five years.

(ii) # of Hours Plant is Offline (Planned)

The Plant performed its routine maintenance activities in a well-planned coordinated effort to reduce the time the Plant was offline.

(iii) Average Day Demand (ML/day)/ Existing Water License Capacity (ML/day)

The Plant is withdrawing water well within its water licence and as a result, there is no current need to consider increasing the water license.

(iv) Maximum Day Demand (ML/ day)/Existing Water License Capacity (ML/day)

The Plant is not physically capable of producing water that would exceed its current water license.

(v) # of Days the Plant Operated > 90% Capacity

The Plant has only exceeded 90% of its capacity once in 10 years. This would indicate that there is no trigger to consider a Plant expansion in the immediate term.

(vi) Average Daily Demand/Plant Maximum Capacity

The Plant's average daily demand is less than 45% of the Plant's maximum capacity. This illustrates that the current Plant meets the needs of the Cities.

(vii) Max Daily Demand/Plant Maximum Capacity

The Plant's maximum daily demand was only 65% of the Plant's maximum capacity. The Plant is currently meeting the needs of the Cities.

(viii) O & M cost + capital reinvestment cost/ML treated

This is also related to the low level of capital reinvestment into the facility. The target is in the order of $600/ ML and currently the rate is only $310/ML. The Plant is currently not sustainable at this rate. This will change over time with the planned capital work over the next 10 years and planned capital water rate increases.

(ix) Chemical cost/ML treated

The poor quality of the raw water in the lake is clearly identified in this score as it is approximately 50% higher than the median of the industry.

This can improve if there is an improvement in the source water quality. As of 2016, there has been little improvement since 2011 when it started to degrade. Over time this may decrease but will not likely reach the industry average due to the eutrophic state of the Lake.

THE YEAR IN REVIEW CONTINUED

PLANT OPERATIONS AND MAINTENANCE (CONTINUED)

(x) Unscheduled Maintenance Hours/Total Maintenance Hours

The Plant's maintenance activities are generally more reactive than planned or preventative when compared to other water treatment Plants. Approximately 10% of the Plant's maintenance is reactive when compared to an industry which is 5%. This should improve with the implementation of the Computer Maintenance Management System over the next few years.

(xi) Annual Recruitment Rate within 6 Months of a Vacancy

The Plant is able to recruit qualified candidates within 6 months of a vacancy.

KEY INFORMATION INDICATORS

IDEAL	GOOD	ACCEPTABLE	WARNING	CRITICAL	NO DATA
125% or greater	100–125%	80–100%	50–80%	< 50%	Target information not available

	Target	2013 Values		2014 Values		2015 Values		2016 Values		Plant's Ranking
PROVIDE RELIABLE SERVICE AND INFRASTRUCTURE										
5 Year Running Average Capital Reinvestment/ Replacement Value *	>0.67%	0.09%		0.09%		0.11%		0.11%		
# of Unplanned Hours that Plant could not Operate at Rated Capacity	0	262.6	Hours	0.0	Hours	476.0	Hours	35.0	Hours	
# of Hours Plant was Offline (Planned)	<120							78.5	Hours	
# of Hours Plant was Offline (Unplanned)	0							1.0	Hours	
ENSURE ADEQUATE CAPACITY										
Average Day Demand (ML/day)/Existing Water License Capacity (ML/day)	<37%	28.7%		25.4%		28.4%		26.6%		
Maximum Day Demand (ML/day)/Existing Water License Capacity (ML/day)	<100%	45.1%		43.1%		40.7%		39.9%		
# of Days the Plant Operated >90% Capacity	<0.4	0.0	Days	0.0	Days	0.0	Days	0.0	Days	
# of Days the Plant Operated > 100% Capacity	0	0.0	Days	0.0	Days	0.0	Days	0.0	Days	
Average Daily Demand/Plant Maximum Capacity	<100%	47.3%		42.0%		46.8%		43.9%		
Max Daily Demand/Plant Maximum Capacity	<100%	74.3%		71.1%		67.0%		65.9%		
Available Water Supply (years)	3+	3 +	Years	3 +	Years	3 +	Years	3 +	Years	
Water Loss	<7.3%	6.1%		6.5%		6.5%		6.8%		
MEET SERVICE REQUIREMENTS WITH ECONOMIC EFFICIENCY										
# of FTEs/1,000 ML Treated	<1.08	0.85	FTE/1000 ML	0.91	FTE/1000 ML	0.91	FTE/1000 ML	0.97	FTE/1000 ML	
Estimated % of O & M Externally Contracted	10.0%	10.0%		10.0%		10.0%		10.0%		
O & M Cost/ML Treated	<$280	$229.75	/ML	$245.95	/ML	$277.24	/ML	$283.89	/ML	
O & M Cost as % of Replacement Value *	<3.0%	2.7%		2.8%		3.1%		3.1%		
(O & M Cost + Capital Reinvestment Cost)/ ML Treated	~$600	$234.01	/ML	$260.33	/ML	$287.01	/ML	$338.42	/ML	
Power Consumed in kWh/ML Treated	<600	563.39	kWh/ML	596.11	kWh/ML	595.55	kWh/ML	585.10	kWh/ML	
Gas Consumed in GJ/ML Treated	<1.5	1.49254	GJ/ML	1.52683	GJ/ML	1.31089	GJ/ML	1.28150	GJ/ML	
Cost of Energy (Power and Gas) Purchase $/ ML Treated	<$55	$52.14	/ML	$49.83	/ML	$47.20	/ML	$52.64	/ML	
Chemical Cost/ML Treated	<$37.30	$56.57	/ML	$60.02	/ML	$78.72	/ML	$72.95	/ML	
Unscheduled Maintenance Hours/Total Maintenance Hours	<7.4%	7.08%		11.74%		10.18%		10.00%		

***Plant replacement value is not known but will be estimated.**

KEY INFORMATION INDICATORS (CONT'D)

IDEAL	GOOD		WARNING	CRITICAL	NO DATA
125% or greater	100–125%		50–80%	< 50%	Target information not available

	Target	2013 Values		2014 Values		2015 Values		2016 Values		Plant's Ranking
PROTECT PUBLIC HEALTH AND SAFETY										
Drinking Water Quality Objectives Compliance Rate	100%	100%		100%		100%		100%		
Annual # of Occurrences of Total Coliforms in Treated Water	0	0	Occurrences	0	Occurrences	0	Occurrences	0	Occurrences	
Annual # of Occurrences of Background Organisms in Treated Water >200/100ml	0	0	Occurrences	0	Occurrences	0	Occurrences	0	Occurrences	
Annual # of Occurrences Turbidity Exceeded 1.0 NTU in Treated Water	0	0	Occurrences	0	Occurrences	0	Occurrences	0	Occurrences	
Annual # of Occurrences Total Chlorine Residual in treated water <0.5 mg/l	0	0	Occurrences	0	Occurrences	0	Occurrences	0	Occurrences	
PROVIDE A SAFE AND PRODUCTIVE WORKPLACE										
Annual Recruitment Rate within 6 Months of a Vacancy	>90%	100%		100%		100%		100%		
Annual Retention Rate	>90%	93.3%		93.9%		94.0%		91.0%		
Annual Number of Grievances	0	0		0		0		0		
# of Accidents with Lost Time/1,000 FTE Hours	0	0.03	/1000 FTE Hours	0.02	/1000 FTE Hours	0.00	/1000 FTE Hours	0.02	/1000 FTE Hours	
# of Lost Hours due to Accidents/1,000 FTE Hours	0	6.88	/1000 FTE Hours	5.08	/1000 FTE Hours	0.00	/1000 FTE Hours	0.89	/1000 FTE Hours	
# of Sick Days Taken per Employee	<7.5	10.1	Days	9.6	Days	7.1	Days	8.5	Days	
# of Employees Eligible to Retire for Rule of 80		7		7		7		7		
Cost of Overtime Hours	<$135,000	$103,094		$102,643		$159,612		$121,586		
BUDGET COMPLIANCE										
Year End Operating Budget - Revenue Over Expenses	>1.5%	2.6%		4.0%		12.9%		0.5%		
Year End Operating Budget - Expenses Over Budget	+/- 1.5%	0.5%		-2.1%		5.0%		-6.4%		
Year End Operating Budget Reserve	>0							$0.05	Million	
Year End Capital Budget Reserve Total	>0	$2.6		$3.1	Million	$2.4	Million	$2.72	Million	
Year End Capital Budget Unallocated Reserve	>0							$1.75	Million	

***Plant replacement value is not known but will be estimated.**

THE YEAR IN REVIEW CONTINUED

PLANT OPERATIONS AND MAINTENANCE (CONTINUED)

REGULATORY AND GOVERNMENTAL AFFAIRS

The Water Security Agency conducted two routine inspections of the Plant; the first on March 11th and the second on September 14th. No deficiencies were noted. Since these regulations have been in place, not one deficiency has been observed on any inspection.

The Corporation's Permit to Operate was renewed to January 1st, 2019.

One requirement of the regulations is that the laboratory analytical work required by a Water Treatment Plant's Permit to Operate must be done by an accredited laboratory. The Corporation's laboratory fulfilled all requirements to maintain accreditation from the Canadian Association for Laboratory Accreditation (CALA). The laboratory participates in four sets of proficiency test samples each year.

The Water Regulations require that the Corporation submit results of the weekly bacteriological, monthly trihalomethane and quarterly major ion analyses promptly to The Water Security Agency and that a Drinking Water Quality and Compliance Report be published annually.

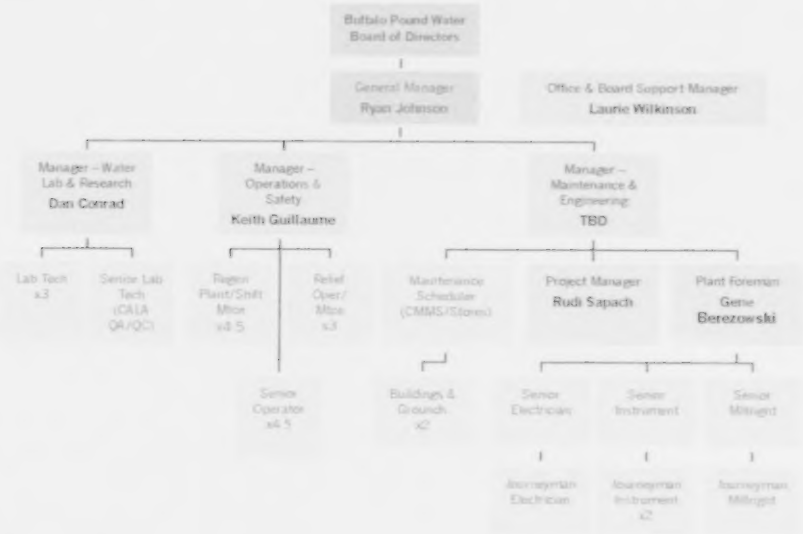
The required Drinking Water Quality and Compliance Report is provided in the Appendix. The Plant met all sample submission requirements of the Plant's operating permit. The Plant is in full compliance with the Water Regulations.

Plant operations are subject to the Federal National Pollutant Release Inventory (NPRI) Legislation, Canadian Nuclear Safety Commission (CNSC), as well as the Environmental Emergency Regulations. The required inventory submissions were made to the NPRI program. Radioactive substances are used in the laboratory's electron capture detectors. Although the licence requirements for electron capture detectors have been terminated by the CNSC, swipe tests are still conducted as part of the general maintenance program. Swipe tests, ensuring the integrity of these detectors, were sent to Saskatchewan Labour for analysis; no leakage above the guidelines was detected.

PLANT OPERATIONS AND MAINTENANCE (CONTINUED)

September 2016

BUFFALO POUND WATER ORGANIZATIONAL CHART


Buffalo Pound Water Board of Directors
General Manager Ryan Johnson
Office & Board Support Manager Laurie Wilkinson
Manager – Water Lab & Research Dan Conrad
Manager – Operations & Safety Keith Guillaume
Manager – Maintenance & Engineering TBD
Lab Tech x3
Senior Lab Tech (CALA QA/QC)
Region Plant/Shift Mtce x4.5
Relief Oper/ Mtce x3
Maintenance Scheduler (CMMS/Stores)
Project Manager Rudi Sapach
Plant Foreman Gene Berezowski
Senior Operator x4.5
Buildings & Grounds x2
Senior Electrician
Senior Instrument
Senior Millwright
Journeyman Electrician
Journeyman Instrument x2
Journeyman Millwright

HUMAN RESOURCES

In 2016, the Plant employed a total permanent staff of 32, consisting of six (6) out-of-scope staff, nine (9) operating staff, four (4) laboratory technologists, seven (7) journeyman maintenance persons, four (4) maintenance persons, and two (2) buildings and grounds staff. The in-scope staff is represented by UNIFOR Local No. 595.

In 2016, three (3) employees terminated their employment: one (1) to an outside employment opportunity and two (2) to retirement. Two (2) employees were also on maternity leave for a portion of 2016 and were backfilled with a casual employee.

Staff at the Plant participates in the Regina Civic Employees Pension Plan. The General Manager was appointed as vice-chair of the new Sponsor Board.

The current collective agreement with UNIFOR Local No. 595 expired December 31, 2016.

In August, the staff were reorganized into three divisions based on business function. The Maintenance and Engineering Manager position remains vacant.

WATERSHED PROTECTION

The Corporation continues to be involved in consultation processes dealing with watershed protection in the Upper Qu'Appelle River and Buffalo Pound Lake. The Water Lab and Research Manager attended the Annual General Meeting on April 9th and a regular meeting on December 14th.

MISCELLANEOUS

The General Manager and the Board Chair attended the National Water and Wastewater Benchmarking Initiative (NWWBI) workshop in Montreal, QC.

The Project Manager, Operations and Safety Manager and General Manager attended the Western Canada Water and Wastewater Association conference in Calgary, AB.

The Plant Foreman and four staff members attended the Saskatchewan Water and Wastewater Association annual conference in Saskatoon, SK.

The Project Manager and General Manager attended the Asset Management (NWWBI) workshop in Edmonton, AB.

The Water Lab & Research Manager attended the National Water and Wastewater conference in Toronto, ON.

The Project Manager attended the BC Water and Waste Association conference in Whistler, BC.

RESEARCH AND ANALYTICAL PROGRAM PROCESS DEVELOPMENT

As a result of the reduced production events of 2015, laboratory staff was tasked with finding chemical solutions to the various challenges that the water source and Plant presents. Clarifier upsets seem to be best attributed to rapid changes in water temperature rather than oversaturation with dissolved gases or, within reasonable limits, changes in raw water pH as a result of biological activity in the lake. Short-circuiting within up-flow clarifiers as installed at the Plant is especially problematic even for rapid changes in temperature as minor as 0.5°C. During the spring of 2015 temperature swings as large as 8°C within one hour presented extreme tests to operations by causing floc to carry over from the clarifiers onto the filters. This greatly reduced filter run times to as short as eight hours. Thankfully the weather related conditions of extended calmed winds coupled with spring day-time temperatures exceeding 28°C and lows of zero suffered in 2015 were not encountered during 2016.

Jar tests were conducted with various polymers and doses at different application points were carried out. The eventual choice of best chemical was a cationic polymer dosed at 0.2 mg/l applied between flocculator 1 and 2. This produced a much larger floc that better survived the high shear conditions endured in the treatment train. During clarifier upsets any floc carried over seemed to be removed in the upper portions of the filters. Eventually shorter filter run times resulted in lowering polymer doses to 0.1 mg/l which seems to strike a workable balance between floc qualities and filter run times. This dose seems appropriate for both alum and polyaluminum chloride coagulants.

The above chemical treatments and modified operations in terms of maintaining higher channel levels that reduce shear represent what can be achieved with present equipment. Clarifier studies for modification or replacement and filter rehabilitation of media and underdrains have both been identified in the Capital Plan.

ALTERNATE PRE-OXIDANTS TO REPLACE PRE-CHLORINATION

Lake water quality has deteriorated over the last six years as a result of higher precipitation carrying humic materials from the local watershed into the lake and reduced diversions of better quality Lake Diefenbaker water. Higher water levels downstream of Buffalo Pound Lake has meant that releases from Buffalo Pound Lake have been greatly reduced, often no more than that required to maintain acceptable operation of the fish ladder at the Buffalo Pound Lake Dam.

THE YEAR IN REVIEW CONTINUED

PLANT OPERATIONS AND MAINTENANCE (CONTINUED)

During the warmest days of summer, evaporation from Buffalo Pound Lake exceeds the sum of water released over the Buffalo Pound Lake Dam, the withdrawals of water by the Plant and the withdrawals of water by industrial users. As a consequence the levels of naturally occurring organic matter and minerals have increased to historically high levels.

One aspect of this poorer raw water quality is the increased formation of trihalomethanes at the Plant and especially so within the Owners' distributed water. During the full-scale evaluation of removing prechlorination it was noted that alum doses needed to be increased 20 mg/l to maintain the same quality of filtered water. This led to the decision to evaluate alternative pre-oxidants in terms of their potential improvement of coagulation, reduction of trihalomethane formation and control of odour.

Potassium permanganate ($KMnO_4$) and chlorine dioxide (ClO_2) followed by coagulation were chosen for evaluation as they are approved for water treatment and there is some actual experience in their use. These chemicals are not without issues as they form residuals that impact water quality and potentially human health and so might compromise their use. Laboratory staff developed analytical methods for those chemicals, determined the oxidant demands with raw water and measured their decay rate. Those experiments produced the experimental levels for ongoing evaluations with varying raw water quality over the next two years.

In addition, both conventional coagulation and enhanced coagulation (a combination of alum and acid to reduce pH) without pre-oxidants were included as possible process variations that would achieve the same hoped for benefits with fewer concerns about residuals.

The adjustment of the pH at the Plant has also been identified as part of the Capital Plan.

Conventional prechlorination and coagulation as carried out at the Plant provides a baseline to compare the above alternate treatments. Many parameters are being tested in these evaluations including settled water turbidity, pH, DOC removal, impacts on UV transmittance, pre-oxidant and coagulant residuals, odour control and most importantly the reduction of both trihalomethanes and haloacetic acid. The formation of chlorination by-products will consider reaction times and doses that might be experienced in the customers' distribution systems. It was observed that the reductions of trihalomethanes and haloacetic acids at the Plant are much more dramatic than those likely, to be achieved within the Cities distributed water. Therefore, the kinetics of formation and speciation of the various trihalomethanes and haloacetic acids must be considered as well.

ADDITIONAL MONITORING OF TREATED AND RAW WATER

The analyses required in the Corporation's Permit to Operate on the treated water represent only a portion of those carried out at the Plant. The Corporation will also carry out regular monitoring of raw water quality as this would provide early warning of chemicals that could impact treated water quality. This work was contracted out to a laboratory capable of providing analyses as low as parts per trillion. Seventy pesticide compounds were tested for and most of those are without Health Canada Guidelines. Various anthropogenic compounds (in total 53) associated with human use such as pharmaceuticals personal care products were also tested for.

The laboratory also conducts regular analyses throughout the year for benzene, toluene, xylenes and ethylbenzene that would indicate spilled gasoline or diesel fuels. Thus far, the lake does not seem impacted to any level of concern for the above suites of chemical pollutants.

In anticipation of additional monitoring of raw water quality being required, microcystin analyses were carried out in July and September. At the peak of cyanobacterial blooms microcystin concentrations reached 7 ug/l in the raw water but were reduced to 0.1 ug/l or less by conventional treatment and to non-detectable levels after GAC treatment. Microcystin is oxidized by the chlorine used as a pre-oxidant and any remaining is adsorbed by granular activated carbon.

WATERSHED MONITORING

Monitoring of the Upper Qu'Appelle River watershed, including Buffalo Pound Lake, is typically carried out on an annual basis. This year sampling was curtailed by road construction and available resources. The Marquis bridge crossing (the last sampling point on the Upper Qu'Appelle River), the west arm of Buffalo Pound Lake and the raw water intake located near the east end of Buffalo Pound Lake were sampled May 30th and September 27th. Analyses of samples from Marquis and the west arm of Buffalo Pound Lake are indicative of better water quality than where the raw water intakes are located.

Those sampling points are more likely impacted by diversions of better quality water from Lake Diefenbaker than the main portion of Buffalo Pound Lake which is much larger in volume.

Sampling for various pharmaceuticals and anthropogenic compounds was also carried out in June. In the west arm of Buffalo Pound Lake N,N-diethyl-meta-toluamide, better known as DEET was detected at very low level 19 parts per trillion (0.000019 mg/l). The pesticide 2,4-D was also detected at 30 parts per trillion (0.000030 mg/l) which is 3000 times lower than the Health Canada Guideline.

For a third summer, a buoy with various water quality sensors, was deployed near the raw water intakes by the University of Saskatchewan team lead by Dr. Helen Baulch. The sensors again proved their worth by providing early warning of changing weather and water quality conditions that could impact treatment and production rates.

The laboratory at the Plant has been analyzing many components of raw and treated water over the years. The database of Buffalo Pound Lake water quality extends from 1969 to the present. The database of the Upper Qu'Appelle River Watershed which includes Lake Diefenbaker now covers over thirty-five years from 1979 to the present. These long-term databases prove useful to the various government agencies and researchers that regularly request them.

THE YEAR IN REVIEW CONTINUED

PLANT OPERATIONS AND MAINTENANCE (CONTINUED)

OPERATIONS BUDGET

The 2016 water rate for the Cities of Regina and Moose Jaw increased by 15.4% from the 2015 rate to $272.00 per megalitre. The electrical rate was set at $0.09066 per KWH for 2016, an increase of 4.0% from 2015.

The Cities of Regina and Moose Jaw forecasted water sales of 29,335 ML and 5,950 ML respectively; an increase of 4.7% from 2015 actual sales or a decrease of 3.9% from 2015 forecasted sales. However, actual water sales were down 8.0% from Regina's and 9.3% from Moose Jaw's water sales forecast.

Total water sales to the Cities in 2016 were 27,149 ML to Regina and 5,398 ML to Moose Jaw. Sales to Regina decreased 3.2% (from 2015) and sales to Moose Jaw decreased 4.4%.

Operations at the Plant resulted in a deficit of $48,874.43 in 2016.

The largest contribution to the deficit was the water sales being significantly lower than forecasted by $686,132.51 due to the Cities overestimating their water use. The actual expenses were under budget by $637,258.08. The amount of chemical remained historically high but was impacted by weather and consumer consumption practices.

The bulk of the cost savings were due to lower chemical usage as there was some improvement in the raw water quality during the year. The Maintenance and Engineering Manager position was not filled and utility costs were down with the warm winter. In addition, some minor maintenance was deferred minimizing the deficit.

Audited financial statements are contained in Appendix 2. Graph 4 on the following page summarizes expenses for 2016 as a percent of the total budget.

CAPITAL BUDGET

2016 introduced the first Capital Water Rate of $73.00 per megalitre. This rate will provide funding for capital works for the Corporation. This is anticipated to increase significantly to approximately $300.00 per megalitre by 2022 to fund the Corporation at sustainable levels.

The Capital Budget started the year with $2,056,416.00 in reserves. The Capital Water Rate generated $2,479,086.61 during the course of 2016 and $1,817,829.74 was spent on capital projects.

At year end, $969,219.63 was carried forward into 2017 to complete 2016 projects and the Unallocated Capital Reserve contains $1,748,453.24.

GRAPH 4

EXPENSE SUMMARY

APPENDICES

2016

APPENDIX 1
WATER QUALITY ANALYTICAL DATA – 2016

- Drinking Water Quality and Compliance Report for 2016
- Raw and Treated Water Analysis

APPENDIX 2
AUDITED FINANCIAL STATEMENTS – 2016

APPENDIX 1

DRINKING WATER QUALITY AND COMPLIANCE REPORT FOR 2016

INTRODUCTION

The Water Security Agency requires each Permittee to monitor water quality as stipulated under its Permit to Operate a Waterworks. Permittees are also required to prepare an annual report to their customers and the Saskatchewan Water Security Agency summarizing the analytical results of the monitoring in a report entitled "Drinking Water Quality and Compliance Report."

For more information about the meaning and type of sample refer to the Water Security Agency's "Municipal Drinking Water Quality Monitoring Guidelines, or the associated website http://www.saskh2o.ca/DWBinder/epb205.pdf.

The guidelines for Canadian Drinking Water Quality are developed by the Federal-Provincial-Territorial Committee on Drinking Water and are published by Health Canada. The province of Saskatchewan utilizes the guidelines in issuing Permits to Operate for regulated water works. Guidelines for chemical and physical parameters are either:

1. Health based and listed as a Maximum Acceptable Concentration (MAC);
2. Based on aesthetic considerations and listed as an Aesthetic Objective (AO);

   or

3. Established based on operational considerations and listed as an Operational Guidance value (OG).

Throughout this document the analytical values are reported as well as the units of measure. Many parameters are not detectable in the treated water. Wherever the "less than sign" (<) is used it is followed by the method detection limit. This means that the parameter was not detected at or above the level indicated.

APPENDIX 1 (CONTINUED)

DRINKING WATER QUALITY AND COMPLIANCE REPORT FOR 2016 (CONTINUED)

WATER QUALITY STANDARDS – BACTERIOLOGICAL QUALITY

According to its Permit to Operate a Waterworks the Corporation is required to analyze one sample every week from the treated water for Bacteriological Quality. Coliforms were never detected in the treated water.

Parameter	Limit	Number of Samples Submitted	Number of Samples Exceeding Limit
Total Coliforms	0 per 100 ml	52	0
Background Organisms	<200 per 100 ml	52	0

WATER QUALITY STANDARDS – FILTER TURBIDITY

The Corporation is required to monitor the effluent turbidity from all twelve filters on a Continuous Basis. The turbidity from each individual filter shall be less than 0.3 NTU, 95% of the time. The turbidity shall not exceed 0.3 NTU for more than 12 consecutive hours and shall never exceed 1.0 NTU. If, on those occasions when the monthly average of the source water turbidity is less than 1.5 NTU, the water turbidity levels from each filter must be less than 0.2 NTU, 95% of the time, the turbidity shall not exceed 0.2 NTU for more than 12 consecutive hours and shall never exceed 1.0 NTU.

This Plant's SCADA Control System automatically generates an alarm if a filter effluent turbidity exceeds 0.3 NTU. If the turbidity exceeds 0.4 NTU at any time, the Plant's SCADA Control System automatically closes the filter effluent valve, turning off the filter. The Corporations' operating permit requires on-line turbidity monitoring on the effluent of each of its twelve filters. A problem with the turbidity monitor or data transfer system to the Plant's SCADA requires a shutdown of the affected filter. To address this possibility the Plant has a second independent turbidimeter on each filter so that continuous monitoring can be maintained even if the first turbidimeter fails. A fault condition on any one turbidimeter will also generate an alarm.

WATER QUALITY STANDARDS – FLUORIDE

The Plant adds fluoride to the water pumped to the City of Moose Jaw and is required to monitor the fluoride level in that water on a continuous basis. The Maximum Acceptable Concentration (MAC) is 1.5 mg/l. Alarms signal a high residual dose at 1.4 mg/l. Fluoride addition was restarted March 10th upon the completion of construction intended to strengthen the 1955 pump well floor. Operation of the fluoride feeder was continuous except for periods when feeder maintenance was being carried out.

The maximum recorded level of fluoride via a laboratory analysis for water pumped to Moose Jaw was 0.69 mg/l. Fluoride in the water destined for Moose Jaw averaged 0.58 mg/l during the period when fluoride addition was carried out.

WATER QUALITY STANDARDS – CHLORINE RESIDUAL

To ensure adequate disinfection the Corporation must monitor the chlorine residual of the treated water on a continuous basis and the free chlorine residual shall not be less than 0.1 milligrams per litre. The normal operating range for the free chlorine residual in the treated water is 0.9 to 1.1 mg/l.

The SCADA control system will automatically shut off pumping to the Owners if the chlorine level is less than 0.5 mg/l. A high level chlorine alarm will alert the operator if chlorine levels in the clearwell exceed 1.3 mg/l.

WATER QUALITY STANDARDS – CHEMICAL – GENERAL

As part of the Corporation's "Permit to Operate" a general chemical analysis is required once in every three month period from the treated water. Only two of these parameters have an established Maximum Acceptable Concentration (MAC). Eight others have an Aesthetic Objective (AO) which is desirable but has no impact on human health.

Parameter (mg/l) unless stated	Feb. 12	May 9	Aug. 8	Nov. 14	MAC	No. of Samples Exceeding MAC or AO
Nitrate	0.19	<0.04	0.53	0.18	45	0
Fluoride	0.11	0.11	0.10	0.10	1.5	0
					AO	
Alkalinity	194	155	102	124	500	0
Chloride	64.94	28.72	32.16	28.42	250	0
Hardness	324	274	221	255	800	0
Magnesium	39.5	32.2	31.0	31.1	200	0
pH (pH units)	7.39	7.15	6.97	6.88	6.5 – 9.0	0
Sodium	118.7	96.0	82.1	90.0	300	0
Sulphate	316.3	274.2	261.2	286.6	500	0
Total Dissolved Solids	738	600	560	598	1500	0
Carbonate	ND	ND	ND	ND	N/A	
Calcium	64.0	56.0	38.0	48.6	N/A	
Conductivity (uS/cm)	1117	904	812	881	N/A	
Bicarbonate	236	189	124	151	N/A	

(ND) Not Detected

WATER QUALITY STANDARDS – CHEMICAL – HEALTH

The Corporation is required to sample the treated water for the following parameters once in every six month period. Eight of these parameters have an established MAC. Five parameters have guideline values which establish a target that could be expected from well-functioning water treatment plants or are aesthetic objectives for the taste or appearance of treated water.

Parameter (mg/l)	May 16	Nov 28	MAC	Number of Samples Exceeding MAC
Arsenic	0.0004	0.0005	0.010	0
Barium	0.065	0.073	1.0	0
Boron	0.08	0.10	5.0	0
Cadmium	<0.00001	0.00002	0.005	0
Chromium	<0.0005	<0.0005	0.05	0
Lead	<0.0001	<0.0001	0.01	0
Selenium	0.0005	0.0004	0.01	0
Uranium	0.0008	0.0004	0.02	0

			Guideline	# of Samples Exceeding Guideline
Aluminum	0.026	0.14	0.1 (annual average)	0
Copper	0.0005	0.0007	1.0	0
Iron	0.0021	0.0012	0.3	0
Manganese	<0.0005	0.0006	0.05	0
Zinc	<0.0005	<0.0005	5.0	0

APPENDIX 1 (CONTINUED)

DRINKING WATER QUALITY AND COMPLIANCE REPORT FOR 2016 (CONTINUED)

WATER QUALITY STANDARDS – PESTICIDES

Once per year the Corporation is required to have the treated water analyzed for the following pesticides. Fourteen of the parameters listed below have an established MAC. Three parameters have no MAC but are required by the corporation's regulatory permit to be monitored.

Parameter (mg/l)	Feb. 22	MAC	Number of Samples Exceeding Limit
Atrazine	<0.001	0.005	0
Bromoxynil	<0.0005	0.005	0
Carbofuran	<0.0002	0.09	0
Chlorpyrifos	<0.002	0.09	0
Dicamba	<0.0005	0.12	0
Dichlorprop 2-4DP	<0.0005	N/A	0
Diclofop-methyl	<0.003	0.009	0
Dimethoate	<0.002	0.02	0
Ethalfluralin	<0.001	N/A	0
Glyphosate	<0.00004	0.28	0
Malathion	<0.002	0.19	0
MCPA	<0.001	0.10	0
Pentachlorophenol	<0.002	0.06	0
Picloram	<0.001	0.19	0
Triallate	<0.001	N/A	0
Dichlorophenoxyacetic Acid 2.4 (2.4-D)	<0.0005	0.1	0
Trifluralin	<0.001	0.045	0

WATER QUALITY STANDARDS – DISINFECTION BY-PRODUCT – TOTAL TRIHALOMETHANES

As part of the Corporation's "Permit to Operate" an analysis for total trihalomethanes is required once per month from the treated water. The MAC is 0.1 milligrams per litre, or, 100 micrograms per litre (parts per billion) for the sum of four trihalomethanes on an annual average. The annual average of total trihalomethanes was 57 micrograms per litre which is below the MAC.

Parameter (ug/l)	Jan 4	Feb 1	Mar 30	Apr 4	May 9	Jun 22
Chloroform	34	40	33	32	36	2
Bromodichloromethane	23	28	23	25	26	<1
Dibromochloromethane	13	15	14	15	13	<1
Bromoform	2	2	2	2	2	<1
Total Trihalomethanes	72	85	72	74	77	2

	Jul 4	Aug 2	Sep 6	Oct 3	Nov 21	Dec 7
Chloroform	4	35	54	46	26	22
Bromodichloromethane	<1	13	19	22	15	14
Dibromochloromethane	1	3	4	7	7	7
Bromoform	1	<1	1	2	<1	<1
Total Trihalomethanes	6	51	78	77	49	42

WATER QUALITY STANDARDS – DISINFECTION BY-PRODUCT – HALOACETIC ACIDS (HAA5S)

The Corporation is obligated to sample for Haloacetic Acids every three months. The annual average of quarterly samples (25 ug/l) was well below the MAC which is based on an average of four samples. The results are as follows:

Parameter (ug/l)	Feb 2	May 16	Jul 18	Oct 3	Annual Average	MAC (Average)
HAA5	55.6	45.5	<5	<5	20	80

WATER QUALITY STANDARDS – CYANIDE AND MERCURY

The Corporation is required to submit two (2) samples per year for analysis for Cyanide and Mercury.

Parameter (mg/l)	May 16	Nov. 28 CN Dec. 5 Hg	MAC	Number of Samples Exceeding Limit
Cyanide	<0.001	<0.001	0.2	0
Mercury	<0.00001	<0.000005	0.001	0

APPENDIX 1 (CONTINUED)

DRINKING WATER QUALITY AND COMPLIANCE REPORT FOR 2016 (CONTINUED)

WATER QUALITY STANDARDS – ORGANICS PLUS MICROCYSTIN

The Corporation is required to submit one (1) sample per year for analysis for various organics including Microcystin LR. Organics and pesticides are sampled during summer or winter in alternate years. Microcystin LR is always sampled during July or August. In anticipation of an increased reporting frequency in the future and concerns with raw water quality, microcystin was sampled several times throughout the summer.

Parameter (mg/l)	Feb 23	MAC	Number of Samples Exceeding Limit
Benzene	<0.0002	0.005	0
Benzo(a)pyrene	<0.00001	0.00001	0
Carbon Tetrachloride	<0.002	0.005	0
Dichlorobenzene 1,2	<0.0005	0.2	0
Dichlorobenzene 1,4	<0.0005	0.005	0
Dichoroethane 1,2	<0.0005	0.005	0
Dichloroethylene 1,1	<0.0005	0.014	0
Dichloromethane	<0.0005	0.05	0
Dichlorophenol 2,4	<0.001	0.9	0
Ethylbenzene	<0.0002	0.0024	0
Monochlorobenzene	<0.0005	0.08	0
Tetrachlorophenol 2,3,4,6	<0.001	0.1	0
Toluene	<0.0002	0.024	0
Trichloroethylene	<0.0005	0.05	0
Trichlorophenol 2,4,6	<0.001	0.005	0
Vinyl Chloride	<0.0005	0.002	0
Xylenes	<0.0002	0.300	0

Parameter (mg/l)	July 18	July 26	Aug 22	MAC	Number of Samples Exceeding Limit
Microcystin	<0.0001	<0.0001	<0.0001	0.0015	0

APPENDIX 1
(CONTINUED)

BUFFALO POUND WATER TREATMENT PLANT LABORATORY ANALYTICAL DATA 2016

RAW AND TREATED WATER ANALYSIS

RAW LAKE WATER ANALYSIS

Parameters	Units	JAN Avg	FEB Avg	MAR Avg	APR Avg	MAY Avg	JUN Avg	JUL Avg	AUG Avg	SEP Avg	OCT Avg	NOV Avg	DEC Avg	YEAR AVG	YEAR MIN	YEAR MAX
PHYSICAL																
Colour (Apparent)	Pt/Co	15	79	15	30	15	13	30	43	65	35	35	62	33	10	79
Conductivity	µS/cm	1073	1161	1055	1018	968	945	795	769	796	836	839	869	947	757	1415
Bench Diss. Oxygen	mg/L	11.7	11.2	12.4	11.4	8.7	8.4	8.8	7.9	8.7	9.7	10.2	12.7	9.6	6.9	13.3
Bench Diss. Oxygen	%	89.4	87.3	103.4	89.3	88.6	90.6	100.5	85.2	94.7	92.3	91.5	91.1	89.6	70.3	113.0
ON-LINE Diss. Oxygen	%	101.5	96.0	116.0									106.0	104.2	96.0	116.0
Odour	TO-N	71	50	81	79	57	51	72	105	78	55	30	66	67	13	166
pH	pH units	8.25	8.18	8.30	8.34	8.49	8.67	8.65	8.92	8.66	8.39	8.24	8.42	8.47	8.09	9.09
Temperature	°C	4.1	5.0	6.6	7.4	14.1	19.2	21.8	20.7	14.2	9.1	5.9	1.9	10.6	1.3	22.9
Turbidity	NTU	1.7	2.4	2.6	2.3	2.2	5.0	10.3	12.1	11.4	4.7	3.8	2.9	5.1	1.3	17.3
TDS	mg/L	725	750	740	562	570	542	532	540	549	553	594	624	600	522	750
TDS	mg/L(calc)	573	900	571	696	688	657	596	574	602	645	664	746	683	560	900
Langelier Index (RTW)	pH units (calc)	0.03	0.19	0.11	0.15	0.45	0.71	0.92	0.55	0.42	0.10	0.01	0.23	0.44	0.01	0.95
MAJOR CONSTITUENTS																
Alkalinity(p)	mg/L CaCO3	<DL	<DL	0	2	4	6	11	10	0	2	<DL	3	4	<DL	14
Alkalinity(total)	mg/L CaCO3	235	239	233	201	200	193	166	155	171	165	174	199	192	150	241
Bicarbonate	mg/L	286	291	283	240	234	221	177	164	171	147	212	236	224	153	293
Carbonate	mg/L	<DL	1	2	2	5	7	13	12	9	2	<DL	3	5	<DL	17
Calcium	mg/L	66	66	67	56	56	53	42	37	41	46	49	55	50	36	67
Magnesium	mg/L	40	41	41	33	32	32	31	30	30	32	32	37	33	30	41
Hardness (total)	mg/L CaCO3	325	337	333	277	274	266	232	217	230	243	258	290	264	212	337
Sodium	mg/L	119	120	116	93	91	85	65	60	66	86	90	99	92	79	120
Potassium	mg/L	11.8	11.7	10.8	9.3	8.5	8.5	8.4	8.1	8.4	8.8	8.2	8.7	8.8	7.9	11.8
Sulphate	mg/L	319	326	306	235	229	205	223	214	229	241	244	277	246	212	326
Chloride	mg/L	35.5	36.6	33.9	28.2	28.9	25.6	24.8	24.5	25.8	25.5	25.1	29.5	27.1	24.1	36.6
TRACE CONSTITUENTS																
Aluminum (dissolved 0.45µ)	ug/L	29	14	10	36	25	203	113	105	39	46	29	23	60	10	445
Aluminum (Total)	ug/L	53	52		390	171	440	238	180	230	136	105	74	210	53	579
Ammonia N	mg/L N	0.15	0.24	<DL	<DL	0.16	0.15	0.16	0.35	0.21	0.13	0.13	0.15	0.17	<DL	0.50
BOD (5-day)	mg/L	3.1	4.6	4.6	2.5	1.8	2.0	4.9	5.3	5.0	4.7	4.1	2.0	3.8	1.5	5.3
Bromide	mg/L	<DL	<DL	<DL	<DL	<DL	<DL	0.06	0.05	0.09	<DL	0.06	0.06	<DL	<DL	0.12
Chlorophyll a	µg/L	16	29	11	12	7	17	42	31	75	25	29	45	29	5	106
Fluoride	mg/L	0.19	0.20	0.20	0.18	0.15	0.19	0.18	0.15	0.20	0.20	0.19	0.20	0.19	0.17	0.28
Iron (dissolved)	mg/L	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Manganese (dissolved)	mg/L	0.02	<DL	0.03	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	0.03
Nitrate	mg/L	<DL	<DL	<DL	<DL	<DL	0.09	0.07	0.06	0.06	<DL	<DL	0.06	<DL	<DL	0.09
Organic N	mg/L N	<DL	0.76	0.57	0.73	0.47	0.51	0.92	1.01	0.85	0.57	0.59	0.90	0.74	0.43	1.01
Raw TOC	mg/L C (UV)	10.5	10.2	9.9	7.5	7.6	7.9	8.9	8.7	8.8	8.6	7.7	8.7	8.7	7.1	11.1
Raw DOC (GF diss)	mg/L C (UV)	9.6	10.0	9.5	7.7	7.5	7.9	8.6	8.6	8.5	8.4	7.6	7.9	8.3	7.1	10.3
UV absorbance @ 254nm	Abs 10cm	1.774	1.793	1.665	1.297	1.270	1.220	1.333	1.402	1.365	1.242	1.201	1.252	1.389	1.096	1.803
SUVA	L / mg m	1.906	1.800	1.709	1.691	1.713	1.557	1.696	1.667	1.614	1.476	1.574	1.500	1.641	1.337	1.944
PreFM UV abs @ 254nm	Abs 10cm	1.439	1.442	1.377	0.941	1.018	1.010	1.051	1.109	1.097	1.027	1.012	1.035	1.110	0.564	1.458
Phosphate(ortho)	µg/L P	11	4	6	9	14	9		5	12	22	9	9	10	3	22
Phosphate(total)	µg/L P	48	57	66	72	52	51	53	127	142	92	84	94	83	39	151
Silica (SiO3)	mg/L	6.0	6.8	5.7	4.1	2.7	0.4	2.5	5.0	5.0	5.0	5.6	6.2	4.3	0.2	6.8

CONTINUED >

RAW LAKE WATER ANALYSIS (CONT'D)

Parameters	Units	JAN Avg	FEB Avg	MAR Avg	APR Avg	MAY Avg	JUN Avg	JUL Avg	AUG Avg	SEP Avg	OCT Avg	NOV Avg	DEC Avg	YEAR AVG	YEAR MIN	YEAR MAX
TRACE CONSTITUENTS																
PHPM																
TTHM's (total)	µg/L(ppb)	60	70	75	63	66	78	87	101	81	55	57	42	70	38	113
Chloroform	µg/L	29	34	35	30	34	41	42	59	47	28	28	22	36	20	67
Bromodichloromethane	µg/L	17	22	24	20	20	25	26	29	23	16	19	13	21	12	32
Chlorodibromomethane	µg/L	11	12	14	12	10	12	12	12	10	9	9	7	11	6	16
Bromoform	µg/L	2	2	3	1	2	1	2	1	1	1	1	<DL	1	<DL	3
BIOLOGICAL																
Blue Green Algae (x10^3)	per litre	<DL	<DL	<DL	<DL	89	322	2783	3809	1711	2167	18	<DL	945	<DL	5933
Green Algae (x10^3)	per litre	<DL	1911	705	725	892	1084	3167	4191	4628	2394	2951	11059	2563	104	14333
Diatoms (x10^3)	per litre	<DL	126	222	162	128	69	156	373	361	161	120	375	212	<DL	609
Flagellates (x10^3)	per litre	<DL	1548	1044	995	596	703	884	1209	556	500	1218	370	835	22	2733
Chrysophytes	per litre	<DL	64	91	56	91	75	106	53	31	20	25	9	60	3	203
Nematodes (x10^3)	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Rotifers (x10^3)	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	22
Other (x10^3)	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Total Green & B-G	per litre	<DL	1911	705	725	892	1084	3167	4191	4628	2394	2951	11059	2563	104	14333
BACTERIOLOGICAL																
Total Coliforms	per 100 ml	<DL	2	1	2	4	20	905	500	100	<DL	33	<DL	132	<DL	7000
Total Coliforms (background)	per 100 ml	29	67	105	406	1690	3113	30075	86000	5100	1475	613	468	7525	<DL	70000
Fecal Coliforms	per 100 ml	<DL	<DL	<DL	13	1	7	4	6	3	2	<DL	<DL	3	<DL	35
Standard Plate Count	per 1 ml	28	24	44	32	94	477	718	4206	298	125	40	29	555	2	9660
CHEMICAL DOSES																
Alum	mg/L			92	90	72	73	108	106	105	104	101	104	96	55	113
Alum/Raw DOC	ratio			9.04	11.55	9.37	9.09	12.87	11.86	12.35	12.32	13.22	13.37	11.76	7.43	15.63
Alum DOC Stoich	ratio			0.90	1.02	0.79	0.75	1.04	0.96	1.00	1.00	1.07	1.08	0.96	0.60	1.22
Chlorine pre	mg/L	3.9	4.4	4.5	3.8	3.4	3.9	6.3	8.2	6.3	3.7	3.0	3.4	4.6	2.7	9.5
Chlorine intermed	mg/L															
Chlorine post	mg/L	0.7	0.6	0.7	0.7	0.6	1.7	2.5	1.5	1.5	1.4	1.1	0.7	1.0	0.6	1.7
Plant Flow	MLD	99.6	83.5	90.0	95.8	114.0	106.5	111.5	112.2	98.8	96.3	100.8	100.5	99.9	54.9	130.0
Qu'Appelle Dam Flow	cu m/s	1.70	2.90	2.80	6.70	5.10	3.75	1.33	3.70	2.90	0.38	0.65	1.75	2.51	0.0	6.0
Fluoride (Set Point for M3)	mg/L			0.65	0.63	0.65	0.66	0.65	0.65	0.65	0.65	0.67	0.75	0.66	0.65	0.75
Phenolreal Carbon	mg/L															
CPAC Train A	mg/L	55.0	55.0	46.3									63.3	54.7	46.0	65.0
CPAC Train B	mg/L	55.0	55.0	46.7									60.0	53.8	46.0	60.0
Total Chlorine dose	mg/L (Calc)	4.6	5.2	5.2	4.1	4.0	5.1	7.9	9.7	7.8	5.1	4.0	4.1	5.6	3.5	11.1
Date GAC's ON														31-May		
Date GAC's OFF														15-Nov		
Date Ice ON Lake														01-Dec		
Date Ice OFF Lake														05-Apr		
Date PAC ON																
Date PAC OFF																
Chlorine Residuals Exit Plant (week avg.)																
Free Chlorine	mg/L	1.10	1.12	1.16	1.46	1.07	1.10	1.11	1.13	1.13	1.08	1.12	1.14	1.14	1.05	1.77
Combined Chlorine	mg/L	0.40	0.51	0.57	0.44	0.42	0.12	0.18	0.22	0.26	0.22	0.36	0.44	0.35	0.08	0.61

TREATED WATER ANALYSIS

Parameters	Units	JAN Avg	FEB Avg	MAR Avg	APR Avg	MAY Avg	JUN Avg	JUL Avg	AUG Avg	SEP Avg	OCT Avg	NOV Avg	DEC Avg	YEAR AVG	YEAR MIN	YEAR MAX
PHYSICAL																
Colour (Apparent)	Pt/Co	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Conductivity	µS/cm	1117	1149	1112	913	904	865	837	803	822	856	881	907	900	792	1149
Diss. Oxygen	mg/L	12.8	10.9	12.5	12.4	10.0	7.0	6.9	7.1	9.6	14.1	10.1	13.0	10.5	6.9	14.1
%Sat. Diss. Oxygen	%	104.1	87.3	103.5	100.0	100.7	77.5	79.7	81.2	97.3	114.2	82.9	93.2	92.5	77.5	114.2
Odour(Dechlorinated)	TO.N	7	5	4	5	5	<1	1	2	2	4	4	7	4	<1	8
PreGAC Odour	TO.N						13	34	47	29	12	7		25	5	60
Odour Removal by Coagulation and Filtration	%	89.8%	90.9%	94.4%	93.6%	89.9%	73.9%	52.8%	54.3%	62.9%	78.4%	76.7%	89.2%	78.6%	40.0%	97.3%
Odour Removal Overall	%	89.8%	90.9%	94.4%	93.6%	89.9%	99.6%	99.0%	90.4%	97.3%	93.6%	86.7%	89.2%	93.4%	77.8%	100.0%
PreFM pH	pH units	7.88	7.90	8.03	8.18	8.20	8.39	8.41	8.21	8.06	8.02	7.96	8.05	8.10	7.72	8.56
Coagulation pH - Channel 1	pH units	7.30	7.23	7.25	6.96	7.20	7.24	6.90	6.83	6.78	6.81	6.82	6.99	7.03	6.60	7.49
Coagulation pH - Channel 2	pH units	7.25	7.29	7.29	6.97	7.22	7.24	6.93	6.83	6.80	6.84	6.82	6.96	7.04	6.74	7.43
Clearwell pH	pH units	7.40	7.40	7.36	7.19	7.22	7.35	7.01	7.01	7.00	6.91	6.88	7.01	7.14	6.79	7.55
Temperature	°C	4.1	4.7	6.3	8.9	15.1	19.5	22.2	21.0	15.2	9.7	5.6	1.9	10.9	1.3	23.0
Turbidity	NTU	0.07	0.07	0.09	0.13	0.08	0.10	0.11	0.10	0.11	0.10	0.11	0.13	0.10	0.06	0.19
Total Dissolved Solids	mg/L		756	730	616	600	544	542	560	552	562	598	644	610	542	756
Total Dissolved Solids	mg/L(calc)	757	775	774	692	669	659	612	581	590	626	649	730	703	581	875
Turbidity Log Removal	(calc)	1.39	1.50	1.48	1.39	1.46	1.64	1.95	2.06	2.02	1.65	1.40	1.35	1.61	1.21	2.23
Langelier Index (RTW)	pH units (calc)	0.00	-0.78	0.62	1.14	0.76	0.62	1.10	1.10	1.23	1.31	1.47	1.31	1.00	1.47	0.54
MAJOR CONSTITUENTS																
Alkalinity(p)	mg/L CaCO3	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Alkalinity(total)	mg/L CaCO3	194	200	205	150	159	152	104	95	97	112	123	153	140	88	205
Bicarbonate	mg/L	236	244	250	183	194	186	127	116	118	137	150	186	170	107	250
Carbonate	mg/L	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Calcium	mg/L	64	65	66	56	56	54	42	38	39	45	49	54	52	38	66
Magnesium	mg/L	40	41	41	33	33	31	31	31	30	31	31	36	34	30	41
Hardness (total)	mg/L CaCO3	334	338	332	276	274	263	236	221	222	243	255	293	272	221	338
Sodium	mg/L	119	118	116	92	96	85	86	82	88	86	90	98	96	82	119
Potassium	mg/L	11.8	11.7	10.8	8.2	8.9	8.6	8.4	8.3	8.4	8.2	8.2	8.7	9.2	8.2	11.8
Sulphate	mg/L	316	324	322	266	274	254	277	261	271	287	287	300	288	254	324
Chloride	mg/L	64.9	67.2	61.9	29.6	28.7	28.9	31.3	32.2	31.8	29.0	28.4	47.6	40.1	23.4	67.2
TRACE CONSTITUENTS																
CLEAR WELL																
Aluminum (dissolved 0.45µ)	µg/L Chart	49	50	34	30	26	43	24	11	11	23	22	44	29	<DL	56
Aluminum (total)	µg/L Chart	57	50	33	32	35	50	40	12	20	31	31	56	41	10	95
Aluminum (total 12 mo avg)	µg/L	56	47	42	43	43	46	47	47	49	49	41	41			
Aluminum (particulate)	µg/L (Calc)	8	<DL	<DL	5	9	7	16	<DL	17	8	9	51	10	<DL	51
Mixed Media Filter A																
Aluminum (total)	µg/L	63	53	39	34	33	100	119	65	67	55	80	65	72	33	121
Mixed Media Filter L																
Aluminum (total)	µg/L	62	50	48	62	31	107	112	49	73	82	98	153	79	31	153
PREGAC																
Aluminum (dissolved)	µg/L						69	37	18	19	37	47		40	<DL	75
Aluminum (total)	µg/L Chart						101	124	42	74	94	89		85	29	124
Ammonia N	mg/L N	0.04	0.12	0.10	0.08	0.06	<DL	<DL	0.06	0.05	0.07	<DL	0.07	0.06	<DL	0.12
Bromide	mg/L	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Fluoride	mg/L	0.11	0.11	0.13	0.09	0.11	0.14	0.09	0.10	0.10	0.09	0.10	0.10	0.11	0.09	0.14
Fluoride (RI dose by ISE)	mg/L (wk avg)			0.67	0.67	0.65	0.62	0.51	0.56	0.51	0.52	0.47	0.60	0.55	0.37	0.69

CONTINUED >

TREATED WATER ANALYSIS (CONT'D)

Parameters	Units	JAN Avg	FEB Avg	MAR Avg	APR Avg	MAY Avg	JUN Avg	JUL Avg	AUG Avg	SEP Avg	OCT Avg	NOV Avg	DEC Avg	YEAR AVG	YEAR MIN	YEAR MAX
Iron (dissolved)	mg/L	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Iron (total)	mg/L	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Manganese (dissolved)	mg/L	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Manganese (total)	mg/L	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Nitrate	mg/L N	<DL	<DL	<DL	<DL	<DL	0.05	<DL	0.12	<DL	<DL	<DL	<DL	<DL	<DL	0.12
Organic N	mg/L N	0.48	0.50	0.40	0.26	0.25	<DL	0.17	0.38	0.24	0.20	0.21	0.34	0.29	<DL	0.50
CW TOC	mg/L C	6.5	6.6	6.5	4.6	5.0	1.3	2.2	2.5	3.3	3.4	3.7	4.7	4.2	0.7	6.9
CW DOC (GF diss)	mg/L C	6.6	6.6	6.5	4.7	5.0	1.3	2.1	2.5	3.3	3.4	3.8	4.7	4.2	0.7	6.9
PreGAC DOC (GF diss)	mg/L C						5.4	5.2	5.2	4.9	4.6	4.5		5.0	4.5	5.7
DOC Removal by Coagulation & Filtration	% Removal	33.3%	33.4%	31.5%	30.7%	32.7%	30.8%	39.8%	39.9%	41.9%	45.0%	42.4%	40.6%	37.6%	27.0%	48.9%
DOC Removal by GAC Filtration	% Removal						75.9%	58.7%	48.5%	33.9%	25.9%	22.8%		44.4%	17.4%	87.0%
Total DOC (% Removal)	% Removal	33.3%	33.4%	31.5%	30.7%	32.7%	83.6%	75.2%	65.0%	61.4%	59.3%	50.4%	40.6%	50.3%	25.4%	90.9%
CW Organic Carbon (diss @ 254nm)	Abs 10cm	0.652	0.669	0.649	0.595	0.633	0.065	0.144	0.217	0.273	0.313	0.430	0.553	0.451	0.027	0.916
PreGAC Organic Carbon (diss @ 254nm)	Abs 10cm						0.654	0.576	0.594	0.590	0.556	0.569		0.591	0.540	0.693
Conventional SUVA	L / mg m	1.347	1.311	1.306	1.271	1.261	1.205	1.118	1.129	1.197	1.203	1.277	1.243	1.230	1.018	1.361
CW SUVA	L / mg m	1.347	1.311	1.306	1.271	1.261	0.478	0.655	0.752	0.835	0.914	1.141	1.243	1.043	0.380	1.361
Phosphate(ortho)	µg/L P	<DL	<DL	<DL	<DL	<DL	14	5	9	<DL	<DL	<DL	<DL	2	<DL	14
Phosphate(total)	µg/L P	8	7	8	10	5	19	10	9	<DL	6	6	7	8	<DL	19
Silica (SiO3)	mg/L	5.8	6.3	9.6	4.0	3.2	0.3	2.6	4.3	4.4	5.7	5.1	5.8	4.4	0.3	6.3
CLEARWELL																
TTHMs (total)	µg/L(calc)	74	85	91	82	79	2	25	67	75	65	57	49	61	1	101
Chloroform	µg/L	36	41	42	23	39	2	18	47	49	39	28	25	33	1	55
Bromodichloromethane	µg/L	24	27	30	17	25	<DL	4	16	20	18	20	16	18	<DL	34
Chlorodibromomethane	µg/L	13	15	17	11	12	<DL	2	4	6	5	8	9	9	<DL	19
Bromoform	µg/L	2	2	2	1	2	<DL	1	1	1	2	1	<DL	1	<DL	3
CHANNEL																
TTHMs (total)	µg/L(calc)	68	77	95		69	87	87	96	87	53	46	44	74	44	96
Chloroform	µg/L	31	36	44		30	43	44	49	51	29	24	22	36	22	51
Bromodichloromethane	µg/L	22	25	32		24	27	25	32	25	15	13	14	24	14	32
Chlorodibromomethane	µg/L	13	14	17		13	15	13	15	10	8	7	8	12	7	17
Bromoform	µg/L	2	2	2		2	2	2	<DL	1	1	<DL	<DL	1	<DL	3
PreGAC																
TTHMs (total)	µg/L(calc)						79	81	93	80	50	57		76	47	100
Chloroform	µg/L						40	42	51	44	28	25		40	24	57
Bromodichloromethane	µg/L						25	25	29	24	18	20		24	15	32
Chlorodibromomethane	µg/L						13	12	12	10	10	10		11	7	15
Bromoform	µg/L						1	2	1	2	3	2		2	<DL	3
BIOLOGICAL																
Blue Green Algae	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Green Algae	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Diatoms	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Flagellates	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Crustaceans	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Nematodes	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Rotifers	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Other	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
BACTERIOLOGICAL																
Total Coliforms	per 100 ml	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Total Coliforms (background)	per 100 ml	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Standard Plate Count	per 1 mL	<DL	0.3	<DL	<DL	<DL	0.3	3.5	3.6	2.0	0.5	0.2	<DL	1.2	<DL	27.0

APPENDIX 2

FINANCIAL STATEMENTS 2016

Deloitte.

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Independent Auditor's Report

To the Chairman and Members of the Board of Directors of the Buffalo Pound Water Treatment Corporation

We have audited the accompanying financial statements of the Buffalo Pound Water Treatment Corporation, which comprise the statement of financial position at December 31, 2016, and the statements of operations, change in net financial assets and cash flows for the year then ended, and a summary of significant accounting policies and other explanatory information.

Management's Responsibility for the Financial Statements
Management is responsible for the preparation and fair presentation of these financial statements in accordance with Canadian public sector accounting standards, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility
Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion
In our opinion, the financial statements present fairly, in all material respects, the financial position of the Buffalo Pound Water Treatment Corporation as at December 31, 2016, and the results of its operations, change in its net financial assets and its cash flows for the year then ended in accordance with Canadian public sector accounting standards.

Deloitte LLP

Chartered Professional Accountants
Licensed Professional Accountants

March 29, 2017
Regina, Saskatchewan

Buffalo Pound Water Treatment Corporation

STATEMENT OF FINANCIAL POSITION

[in dollars]

As at December 31

	2016
FINANCIAL ASSETS	
Cash	2,403,467
Accounts receivable	
City of Regina	603,122
City of Moose Jaw	288,050
Other	385,088
Total financial assets	3,679,727
FINANCIAL LIABILITIES	
Accounts payable and accrued liabilities	573,109
Employee benefit obligations (Note 3)	754,156
Total financial liabilities	1,327,265
Net financial assets	2,352,462
NON-FINANCIAL ASSETS	
Inventory of chemicals	113,260
Accumulated surplus (Note 5)	2,465,722

See accompanying notes

SIGNED ON BEHALF OF THE CORPORATION

D Bellows

Board of Directors Chair

Chair of Finance and Audit Committee

Buffalo Pound Water Treatment Corporation

STATEMENT OF OPERATIONS

[in dollars]

For the year ended December 31

	Budget	2016
REVENUES		
General water rate charges		
City of Regina	10,120,555	9,366,349
City of Moose Jaw	2,052,800	1,862,434
SaskWater	52,900	72,054
	12,226,255	11,300,837
Power charges	298,500	312,675
Miscellaneous water sales	69,600	88,132
Interest	10,000	31,087
Other	5,000	23,821
	12,609,355	11,756,552
EXPENSES		
Employee wages and benefits (Schedule 2)	3,548,800	3,620,890
Capital contributions to Buffalo Pound Water Treatment Plant (Schedule 2)	1,636,295	1,910,521
Utilities (Schedule 2)	1,860,400	1,722,057
Chemicals (Schedule 2)	2,561,000	2,299,556
Equipment maintenance (Schedule 2)	1,220,300	1,008,281
Miscellaneous (Schedule 2)	268,900	227,531
Laboratory supplies and maintenance (Schedule 2)	208,700	181,653
Building and ground maintenance (Schedule 2)	121,500	176,269
Administration (Schedule 2)	170,600	200,488
	11,596,495	11,347,246
Contribution from the Buffalo Pound Water Administration Board (Note 4)	-	2,056,416
Excess of revenues over expenses	1,012,860	2,465,722
Accumulated surplus, beginning of year		-
Accumulated surplus, end of year (Note 5)		2,465,722

See accompanying notes

Buffalo Pound Water Treatment Corporation

STATEMENT OF CHANGE IN NET FINANCIAL ASSETS

[in dollars]

For the year ended December 31

	2016
Excess of revenues over expenses	2,465,722
Consumption of inventory of chemicals	2,299,556
Acquisition of inventory of chemicals	(2,412,816)
Deficit of expenses of other non-financial assets over expenditures	(113,260)
Increase in net financial assets	2,352,462
Net financial assets, beginning of year	-
Net financial assets, end of year	2,352,462

See accompanying notes.

Buffalo Pound Water Treatment Corporation

STATEMENT OF CASH FLOWS
[in dollars]

For the year ended December 31

	2016
OPERATING ACTIVITIES	
Excess of revenues over expenses	2,465,722
Net change in non-cash working capital balances	
in accounts receivable	(1,276,260)
in accounts payable and accrued liabilities	573,109
in employee benefits obligations	754,156
in inventory of chemicals	(113,260)
Cash provided by operating activities	2,403,467
Increase in cash	2,403,467
Cash, beginning of year	-
Cash, end of year	2,403,467

See accompanying notes.

NOTES TO THE FINANCIAL STATEMENTS

[in dollars]

For the year ended December 31, 2016

1. BASIS OF OPERATIONS

Pursuant to Articles of Incorporation registered on January 1, 2016 the Corporation was incorporated as the Buffalo Pound Water Treatment Corporation (the Corporation) under The Non-Profit Corporations Act, 1995. The City of Regina and the City of Moose Jaw entered into an Unanimous Membership Agreement effective January 1, 2016.

The Corporation operates the assets of the Buffalo Pound Water Treatment Plant and is responsible for reliable and efficient provision of safe, high quality and affordable drinking water to the City of Regina and the City of Moose Jaw.

Since the Corporation is a not-for-profit organization, it is not subject to either federal or provincial income taxes.

2. SIGNIFICANT ACCOUNTING POLICIES

The financial statements of the Corporation are the representation of management and have been prepared in accordance with Canadian public sector accounting standards, as recommended by the Chartered Professional Accountants of Canada (CPA Canada). Significant aspects of the accounting policies adopted by the Corporation are as follows:

Use of estimates

The preparation of financial statements in conformity with Canadian public sector accounting standards requires management to make estimates and use assumptions that affect the reported amounts of assets and liabilities at the date of the financial statements and the reported amounts of revenue and expenses during the year. Actual results could differ from those estimates.

Inventory of chemicals

Inventory of chemicals are valued at the lower of net realizable value and average cost.

Employee benefit obligations

Employee benefit obligations relating to severance or retirement benefits are recognized to the extent that they are vested and could be taken in cash by an employee on termination. The obligations have been determined on an actuarial basis using the projected benefit method prorated on services. Experience gains/losses are amortized over the estimated average remaining life of the employee group.

Pension benefit obligations

The Corporation is one of the sponsors of a multi-employer defined benefit pension plan. The Corporation follows defined contribution accounting under which pension expense is limited to the Corporation's contributions to the plan.

Contributions

Contributions are considered government transfers and are recognized in the financial statements as revenues or expenses in the period in which events giving rise to the transfer occur, providing the transfers are authorized, eligibility criteria have been met and reasonable estimates of the amounts can be made.

2. SIGNIFICANT ACCOUNTING POLICIES (continued)

Financial instruments

The fair value of cash, accounts receivable, accounts payable and accrued liabilities approximates the carrying value given their short term nature.

Credit Risk

Credit risk is the risk of financial loss to the Corporation if a customer or counterparty to a financial instrument fails to meet its contractual obligations. The Corporation's credit risk is primarily attributable to accounts receivable. This risk is limited as accounts receivable is due mainly from the City of Regina and the City of Moose Jaw.

Liquidity Risk

Liquidity risk is the risk that Corporation will not be able to meet its financial obligations as they become due. The Corporation manages liquidity risk by continually monitoring cash flow requirements to ensure that it has sufficient funds to meet obligations when they become due.

Interest Rate Risk

Interest rate risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in the market interest rates. The Corporation is not exposed to significant interest rate risk.

3. EMPLOYEE BENEFIT OBLIGATION

The employee benefit obligations accrued at year end are as follows:

	2016
Vacation pay	317,156
Vested termination payments	437,000
	754,156

Based upon an agreement with UNIFOR Local 595, termination payments for union employees vest after 15 years of service or upon retiring at the age of 65 after 10 years of continuous service. The amount payable on termination after vesting is 20 hours pay for each completed year of service.

For out-of-scope employees the termination payments vest after 10 years of service. The amount payable on termination after vesting is the wages the employee would have been paid had the employee worked for a time equal to half of their unused sick days on termination date. The maximum termination payment to an out-of-scope employee is 78 days pay.

An actuarial valuation of vested sick leave and severance payments was completed using the projected benefit method at December 31, 2016. The actuarial valuation was based on assumptions about future events including employee turnover and mortality, wage and salary increases, sick leave usage and interest rates. The discount rate used to determine the unfunded employee benefit is 2.0%. The inflation rate is 2.25%. Compensation rates for employees are assumed to increase at an average rate of 3.65% per annum plus merit and promotion thereafter.

3. EMPLOYEE BENEFIT OBLIGATION (continued)

The Corporation is a member of the City of Regina Civic Employees' Superannuation and Benefit Plan (the Plan), which is overseen by its own Administrative Board. All eligible permanent and probation employees of the Corporation are members of the Plan. This multiemployer Plan provides defined retirement benefits and is integrated with the Canada Pension Plan (CPP). The Plan provides a lifetime monthly pension based on an employee's years of service and the average of the best three consecutive years of earnings for service before 2016. For service after 2015, a best-five-years average is used. For 2016 employees contributed 8.80% of their earnings below the CPP maximum and 13.10% of earnings above the CPP maximum and the Corporation's contribution rates were set as 9.80% of their earnings below the CPP maximum and 14.60% of earnings above the CPP maximum.

Financial statements as at December 31, 2015 indicate the Plan had a deficit (unfunded liability) of net assets available to pay accrued pension benefits of $25,727,000.

The Plan is a multiemployer defined benefit plan; therefore neither benefits nor contributions are segregated by employer. The Plan managers have been unable to determine the portion of any unfunded liability attributable to each employer. Accordingly, no portion of the deficiency has been recognized as a liability or expense in the financial statements. The Plan has been accounted for using the method appropriate for defined contribution plans and, as such, the amount of pension expense is equal to the contributions required for the year. Pension costs of $267,352 based on employer contributions were expensed during 2016.

The Corporation is a member of the Regina Civic Employees' Long-term Disability Plan (the Disability Plan). Financial statements as of December 31, 2015 indicate a surplus of net assets available for benefits of $33,421,000.

The Disability Plan is a multiemployer plan and consequently, identification of individual employer's assets is not available from the Disability Plan managers. Accordingly, no portion of the surplus has been recognized as an asset or expense reduction in the financial statements. For in scope employees, disability benefits are based on 70% of the member's salary and will be paid either throughout the duration of the disability, until the member elects voluntary early retirement, reaches age 65 or upon death, whichever occurs first. Full amount of salary will be paid as disability benefits to out-of-scope employees for first two years period and 90% of the member's salary will be paid after. The Disability Plan has been accounted for using the method appropriate for defined contribution plans and, as such, the amount of benefit expense is equal to the contributions required for the year. Member contributions are made to the Plan at a rate of 0.92%, with the employer matching contributions. The Corporation recorded disability premium costs for 2016 of $16,075.

Dental and medical plans are also provided for most employees and are paid for by the Corporation.

4. CONTRIBUTON FROM THE BUFFALO POUND WATER ADMINISTRATION BOARD

On January 1, 2016 the Buffalo Pound Water Administration Board, an entity of the joint venture between the City of Moose Jaw and the City of Regina, transferred net assets with a carrying value and a fair value of $2,056,416 to the Corporation.

NOTES TO THE FINANCIAL STATEMENTS

[in dollars]

For the year ended December 31, 2016

5. ACCUMULATED SURPLUS

The Board of Directors of the Buffalo Pound Water Treatment Corporation has approved the establishment of a capital replacement reserve. In 2016, the Board of Directors approved a transfer to the reserve as stated below.

	Unappropriated Surplus	Capital replacement reserve	2016
Opening balance	-	-	-
Excess of revenues over expenses	2,465,722	-	2,465,722
Transfer of contribution from the Buffalo Pound Water Administration Board	(2,056,416)	2,056,416	-
Transfer from operations	(661,256)	661,256	-
Closing balance	(251,950)	2,717,672	2,465,722

Buffalo Pound Water Treatment Corporation

SCHEDULE OF OPERATIONS

Schedule 1

(in dollars)
For the year ended December 31, 2016

	Operations	Capital replacement	Total 2016
REVENUES			
General water rate charges			
City of Regina operating contributions	7,384,484		7,384,484
City of Moose Jaw operating contributions	1,468,354		1,468,354
City of Regina capital contributions		1,981,865	1,981,865
City of Moose Jaw capital contributions		394,080	394,080
SaskWater capital contributions		72,054	72,054
	8,852,838	2,447,999	11,300,837
Power charges	312,675		312,675
Miscellaneous water sales	88,132		88,132
Interest		31,087	31,087
Other	23,821		23,821
	9,277,466	2,479,086	11,756,552
EXPENSES			
Employee wages and benefits	3,620,890	-	3,620,890
Capital contributions to Buffalo Pound Water Treatment Plant	92,691	1,817,830	1,910,521
Utilities	1,722,057	-	1,722,057
Chemicals	2,299,556	-	2,299,556
Equipment maintenance	1,008,281	-	1,008,281
Miscellaneous	227,531	-	227,531
Laboratory supplies and maintenance	181,653	-	181,653
Building and ground maintenance	176,269	-	176,269
Administration	200,488	-	200,488
	9,529,416	1,817,830	11,347,246
(Deficit) excess of revenue over expenses before contribution fro the Buffalo Pound Water Administration Board	(251,950)	661,256	409,306
Contribution from the Buffalo Pound Water Administration Board	-	2,056,416	2,056,416
(Deficit) excess of revenues over expenses	(251,950)	2,717,672	2,465,722

See accompanying notes

Buffalo Pound Water Treatment Corporation | Schedule 2

SCHEDULE OF EXPENSES

[in dollars]

For the year ended December 31

	Budget	2016
EMPLOYEE WAGES AND BENEFITS		
Wages - permanent employees	2,700,000	2,680,034
Employee benefits - permanent employees	507,000	519,110
Overtime wages - permanent employees	125,000	121,170
WCB premiums	34,000	-
Premium pay - permanent employees	15,700	33,874
Car allowance	10,900	10,365
Clothing and boot allowance	4,000	6,620
Wages - casual employees	64,200	37,694
Employee benefits - vacation, sick and termination		203,548
Employee benefits - casual employees	14,100	3,241
Overtime pay - casual employees	2,900	417
Supplementary maternity/parental leave	8,000	3,410
Employee awards and gifts	2,500	872
Health spending account	500	535
	3,548,800	3,620,890
UTILITIES		
Electricity	1,570,400	1,481,263
Natural gas	290,000	240,794
	1,860,400	1,722,057
CHEMICALS		
Alum	1,850,000	1,555,821
Granular activated carbon	630,000	600,000
Chlorine	153,000	111,856
Powder activated carbon	78,000	8,640
Polymer	80,000	23,239
	2,561,000	2,299,556
EQUIPMENT MAINTENANCE		
Filtration plant	457,500	248,477
Wastewater system	154,500	230,219
Regeneration plant	179,400	89,307
Pump station	246,500	105,546
Computer and communications	141,200	77,571
High power electrical	20,600	30,165
Pipeline	20,600	8,647
Other maintenance		218,349
	1,220,300	1,008,281

SCHEDULE OF EXPENSES (continued)

(in dollars)
For the year ended December 31

	Budget	2016
MISCELLANEOUS		
Insurance	64,000	70,144
General supplies	27,500	2,524
Telephone	16,000	15,894
Professional and membership fees	24,000	18,860
Travel and conventions	24,000	25,493
Maintenance - vehicles	43,000	42,686
Stationary and office supplies	22,000	16,456
Contracted services	10,300	13,082
Advertising	10,000	1,281
Education and training	16,000	12,488
Reception and meetings	4,000	4,693
Contracted and other services	6,100	3,739
Software maintenance	2,000	654
Foreign exchange (gain)/loss	-	(463)
	268,900	227,531
LABORATORY SUPPLIES AND MAINTENANCE		
Laboratory supplies	73,500	73,593
Research	67,200	49,126
Laboratory equipment	43,000	40,210
Contract analytical	10,000	5,882
Accreditation	15,000	12,842
	208,700	181,653
BUILDING AND GROUND MAINTENANCE		
Filtration plant	92,100	153,949
Regeneration plant	13,400	12,556
Lake pump station	16,000	9,764
	121,500	176,269
ADMINISTRATION		
City of Regina administration	35,000	60,950
Board expenses	60,600	32,043
Audit services	15,000	8,715
Board advisory services	60,000	98,780
	170,600	200,488

SCHEDULE OF EXPENSES (continued)

[in dollars]
For the year ended December 31

	Budget	2016
CAPITAL CONTRIBUTIONS TO BUFFALO POUND WATER TREATMENT PLANT		
Capital replacement		
Infrastructure management	150,000	74,535
Lab upgrade	52,000	35,595
Primary solids separation	57,000	43,887
Filter influent channel separator (CF 2015)	-	35,690
Security upgrades (CF 2015)	6,000	101,317
LPS pump C pump and motor (CF 2015)	-	423,546
Pretreatment drain gates	103,000	15,905
Computerised management	69,000	27,190
Chlorination upgrades	268,000	19,169
Waterworks system assessment (CF 2015)	-	12,365
1955 Pumpwell slab reinforcement (CF 2015)	-	447,840
Roof repair	404,295	412,312
Steel corrosion assessment	52,000	32,846
Main plant redundant power	275,000	131,133
Clarifier valves (CF 2015)	-	1,500
Backwash tank and pipelining (CF 2015)	-	1,500
Clarifier metering tanks piping (CF2015)	-	1,500
LPS 138kV Transmission	200,000	-
	1,636,295	1,817,830
Operations		
Capital purchases out of operational budget	-	92,691
	-	92,691
	1,636,295	1,910,521

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